BRITISH MEDICAL JOURNAL

LONDON SATURDAY MAY 18 1940

CONCENTRATED SERUM IN TREATMENT OF TRAUMATIC AND HISTAMINE SHOCK IN EXPERIMENTAL ANIMALS

BY

C. H. BEST, M.D.Toronto, D.Sc.Lond., F.R.S.
Professor of Physiology, University of Toronto

AND

D. Y. SOLANDT, M.D.Toronto, Ph.D.Lond.
Associate Professor of Physiology, University of Toronto
(From the Departments of Physiology and Physiological Hygiene, University of Toronto)

The work of Cannon and Bayliss (1919) during the last war provided an experimental basis for the development of methods for treating wound shock. They demonstrated that effective treatment must restore vascular tone and blood volume.

It is generally agreed that one of the first pathological changes in severe traumatic shock is the fall in the volume of circulating blood. This results in a deficient return of blood to the heart and thus in the low blood pressure characteristic of the condition. The loss of circulating blood may be due to any or all of three causes: it may be the result of frank haemorrhage from injured vessels, of fluid exudation from atonic capillaries, or of stagnation in a dilated capillary bed. Some believe that exudation and stagnation are limited to the wound site (Blalock, Beard, and Johnson, 1931). Others maintain that from the injured tissue is set free a toxic substance which affects capillaries throughout the body, producing these effects remote from the site of injury (Cannon and Bayliss, 1919; Moon, 1936). It is possible that the cause and effect of capillary atony constitute a vicious circle: the embarrassment of the circulation initiated by the atony may result in an ischaemia of arteriolar and capillary walls, thus maintaining the atony after the original causative agent has been removed.

Methods of treating shock must aim at halting these processes and correcting their results. Pituitrin and adrenaline were used extensively and fairly effectively during the last war for the temporary correction of vascular atony. Restoration of blood volume was attempted by the intravenous administration of various aqueous solutions with suitable osmotic characteristics. The most effective of these was gum acacia solution, the administration of which we now know may be attended by grave dangers (Studdiford, 1937; Hall, 1938). Recently Bond and Wright (1938) have used for this purpose blood serum concentrated by the "lyophile" process. Levinson and co-workers (1940) have shown the value of unconcentrated blood serum in the treatment of post-haemorrhagic shock in experimental animals. It is possible that the presence of abnormal amounts of fluid in certain tissues during shock is detrimental, apart from the loss in blood volume which is represented. If this is so treatment should aim at the return of this fluid to the blood stream. This is readily accomplished by the intravenous administration of a hypertonic fluid.

The present work was undertaken with a view to evaluating certain methods of treating shock in experimental animals. We felt that any procedure useful in severe shock should be initiated by the administration of a vasoconstrictor, temporarily to correct vascular atony so that solutions introduced into the blood stream are not lost immediately into tissue spaces. This having been done the blood volume should be increased by an osmotically adequate solution of biologically acceptable constituents. It was hoped that this procedure would break the vicious circle which may be responsible for vascular atony and that adequate vascular tone thus initiated would be maintained after the effects of the vasoconstrictor had worn off. In selecting a solution for the restoration of blood volume it seemed logical to choose one which would reduce tissue fluids. Concentrated blood serum fills all these requirements and has the additional advantage that, unlike whole blood, it may be kept indefinitely without deterioration.

Methods

Dogs under deep nembutal anaesthesia were used in all experiments. Blood-pressure records were taken with a mercury manometer connected to a cannula in a carotid artery. Cell-volume estimations were made with a haematocrit. Blood volume was measured by the dye method, using Evans blue dye and a photo-electric colorimeter (Gregersen, 1938; Kennedy and Millikan, 1938). Serum-protein determinations were made by estimating protein nitrogen in trichloracetic acid precipitates by the micro-Kjeldahl technique. The initial experiments were performed on animals in histamine shock. Histamine was given in a first dose of approximately 0.5 mg. per kg. of body weight, and this was repeated at decreasing intervals until the blood pressure remained below 50 mm. Hg (Dale and Laidlaw, 1918). Traumatic shock was obtained either with or without extensive haemorrhage. If the former was desired a large animal (15 to 20 kg.) was chosen and, under deep anaesthesia, each thigh was given about ten blows with a heavy steel hammer. In such an animal shock developed in less than one hour and was probably chiefly due to the haemorrhage. If shock without extensive haemorrhage was required a small animal (5 to 8 kg.) was chosen, and the thigh muscles were given a total of 1,000 to 2,000 light blows with a rubber mallet. Shock, as indicated

by a blood pressure of below 50 mm. Hg, developed in three to five hours after the trauma was inflicted. All animals were kept deeply anaesthetized during the entire experiment and were killed at the termination.

The concentrated serum used was prepared by evaporating dog-blood serum to one-third its normal volume by Thalhimer's (1939) technique. In this method the serum is placed in closed cellophane sacs, and these are exposed to dried air, which removes water from the surface of the sac. In every case the sera from a number of dogs were pooled. Serum to be used for treating a dog was tested on that animal before the procedure for inducing shock was started. If any untoward reaction occurred serum from another pool was used. Typed human serum prepared by this method has thus far produced no harmful reaction in patients in the limited experience of Dr. Thalhimer (personal communication) or of our clinical colleagues.

Results and Discussion

Low blood pressure was taken as the essential index of shock. Since survival experiments were not feasible the effectiveness of treatment was judged chiefly by the extent and duration of the rise in blood pressure which it produced. Blood-volume, cell-volume, and blood-protein determinations were used to give additional information concerning the severity of shock and the efficacy of treatment.

The results of the treatment of histamine shock are given in Table I. A stable blood pressure at a shock level was seldom seen in these experiments: most of the animals treated had systolic pressures below 50 mm. Hg. As indicated, such animals obtained the greatest benefit from the administration of a vasoconstrictor substance followed by a liberal quantity of concentrated serum. A blood-pressure tracing taken during this type of treatment is shown in Fig. 1. Trauma with haemorrhage produced a sudden fall in blood pressure which occurred at the time the injury was produced. Following this the blood pressure fell slowly, and eventually became stabilized at a low level. The results obtained in the treatment of such shock are set forth in Table II. The best treatment was found to be the same as for histamine shock, and a blood-pressure tracing made during such a procedure is shown in Fig. 2. Trauma without extensive haemorrhage resulted in only a slight and gradual fall in blood pressure at the time the injury was produced. This was followed by a rise and then a slow steady fall in blood pressure. As a rule the blood

FIG. 1.—Treatment of histamine shock. Blood-pressure tracings (18-lb. dog).

FIG. 2.—Treatment of traumatic shock with haemorrhage. Blood-pressure tracings (14-lb. dog).

FIG. 3.—Treatment of traumatic shock without extensive haemorrhage. Blood-pressure tracings (10-lb. dog).

pressure dropped to below 50 mm. Hg in from two to four hours after the trauma was produced. Table III shows the results of the treatment of such shock. Again the administration of a vasoconstrictor substance followed by concentrated serum seemed the best form of treatment if the blood pressure was under 50 mm. Hg. Fig. 3 shows a blood-pressure tracing taken during such treatment. When the blood pressure was above a level of approximately 50 mm. Hg the concentrated serum without the vasoconstrictor was effective.

Treatment of Shock in Dogs

	Dog		Blood Pressure (Systolic)			Treatment†		
	No.	Wt.	Normal	Shock Level	Following Treatment*	Adrenaline (1 : 1,000)	Pituitrin	Concentrated (3x) Serum
		lb.	mm. Hg	mm. Hg	mm. Hg	c.cm.	c.cm.	c.cm.
Table I: Histamine Shock	1	16	150	40 (falling)	88	—	—	20
	2	22	153	25 ,,	25	—	—	40
	3	18	102	40 (steady)	90	—	0.50	25
	4	15	210	55 (falling)	100	—	0.25	25
	5	22	153	25 ,,	78	0.10	—	50
	6	12	165	30 ,,	50	0.10	—	50
Table II: Traumatic Shock with Haemorrhage	7	19	190	68 (steady)	110	—	—	40
	8	19	190	60 (falling)	80	—	—	40
	9	20	135	22 ,,	70	—	0.25	20
	10	14	140	30 ,,	80	—	0.25	40
	11	16	160	20 ,,	50	0.10	—	20
	12	47	130	35 ,,	90	0.10	—	50
	13	31	164	20 ,,	70	0.10	—	60
Table III: Traumatic Shock	14	20	180	56 (falling)	75	—	—	25
	15	16	160	50 ,,	100	—	—	40
	16	12	180	30 ,,	30	—	—	20
	17	12	160	50 ,,	100	—	0.25	20
	18	21	140	60 ,,	90	—	0.25	40
	19	10	180	35 ,,	85	—	0.25	50
	20	13	160	55 ,,	90	—	0.25	20
	21	33	190	55 ,,	90	—	0.25	40
	22	11	180	35 ,,	70	—	0.25	20
	23	12	180	18 ,,	85	0.10	—	60
	24	10	160	25 ,,	70	0.10	—	40
	25	15	180	48 ,,	70	0.10	—	40

* This pressure was maintained for the period of observation (never less than 1 hour) following treatment.
† Vasoconstrictor followed by concentrated serum.

Treatment with vasoconstrictor substances alone was tried in all three types of shock. Our results confirm those of previous investigators. A single dose of adrenaline produced a sudden rise in blood pressure with almost immediate return to the old level. By the continuous administration of adrenaline at a fixed rate it was possible to maintain the blood pressure at a normal level for many hours, but when the injection was stopped the blood pressure returned to the shock level. It is of interest that there seemed to be little adaptation to adrenaline administered continuously over a number of hours. On the other hand, pituitrin administered continuously elicited rapid adaptation, and to be effective the dose had to be progressively increased. As is well known, pituitrin given in a single dose produces much slower but more prolonged rise in blood pressure than does adrenaline. Pituitrin alone, however, like adrenaline, does not have a prolonged beneficial effect on the blood pressure of shocked dogs.

Our experimental results indicate that, unless the blood pressure is very low, pituitrin rather than adrenaline is the vasoconstrictor to use preceding the administration of concentrated serum. Usually the serum was given when the pressure was rising under the influence of the vasoconstrictor. In this way it was thought that leakage of the serum through the walls of dilated blood vessels might be minimized. The fact that this procedure in many cases yielded a relatively permanent rise in blood pressure, such as was never seen under comparable conditions after the administration of either the concentrated serum or the vasoconstrictor alone, lends support to this view.

In a few experiments in which the blood pressure had fallen to very low levels pituitrin produced no rise. In several of these the subsequent administration of adrenaline followed by concentrated serum raised the systolic blood pressure from under 20 mm. Hg to over 70 mm. Hg, where it remained for several hours. Fig. 4 shows the blood-pressure record of such an experiment.

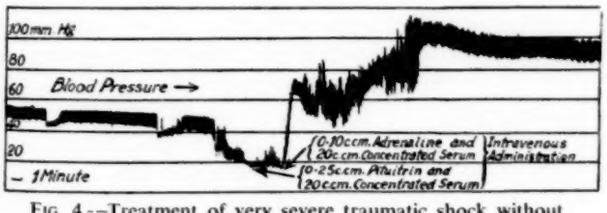


FIG. 4.—Treatment of very severe traumatic shock without haemorrhage. Blood-pressure tracings (12-lb. dog).

Many other workers (Bayliss, 1918; Cannon, 1923; Moon, 1938; Scudder, 1940) have shown that the effect of isotonic or hypertonic dextrose or salt solutions on low blood pressure is quite transient. In our experiments the immediate effect of the osmotically equivalent 20 per cent. dextrose, 3 per cent. sodium chloride solution, or three-times-concentrated blood serum seemed to be about the same. The effect of the dextrose is much more prolonged than that of the salt solution, but even in our short-term experiments dextrose was in some cases demonstrably inferior to concentrated blood serum. Dextrose may have a vasoconstrictor action, as in a few cases it alone was initially as effective as concentrated serum preceded by pituitrin. It is also possible that the dextrose provides a readily available source of energy to ischaemic muscle in heart and blood-vessel walls, and in the past it has often been added to solutions for intravenous administration with this possibility in mind.

In the case of dextrose, salt solution, or blood serum the hypertonic (concentrated) form was found to have a much more pronounced initial effect on the low blood pressure of traumatic shock than the same volume of the isotonic form. This indicates that the concentrated material effectively removed fluid from the tissues into the blood stream. As previously mentioned, this may be beneficial quite apart from the increase in blood volume thus produced. Such removal can only take place when the capillary walls retain their normal function as semi-permeable membranes. This provides a further reason for the administration of pituitrin before the concentrated serum is given.

Haematocrit determinations indicate that in all three types of shock there is a concentration with respect to red blood corpuscles. Blood-protein determinations, however, indicate an actual blood dilution. Both changes are, in part at least, reversed by effective treatment as outlined. Blood-volume determinations are of doubtful validity in the presence of shock (Neuwelt, 1939), but usually indicate that the quantity of circulating blood is decreased in shock and that this value is returned towards normal by adequate treatment. These findings merely substantiate those of earlier workers (Mann, 1915; Bazett, 1918; Keith, 1919), and therefore are not given in detail.

Conclusions

In the above experiments some seventy animals were studied. Ten of these were so severely shocked that no form of treatment was effective. In the remaining cases the treatment resulted in varying degrees of improvement, and the tables and figures give representative results from this group. The results of experiments of the type described are very difficult to evaluate. No two animals react in exactly the same manner to either the shock-producing procedure or the treatment. A statistical evaluation of the methods we have used for treating shock is thus impossible. Our studies have, however, enabled us to draw certain definite conclusions concerning the treatment of shock in experimental animals.

In so far as treatment is concerned, shocked animals respond in the main similarly, whether the condition is initiated by histamine administration, trauma with extensive haemorrhage, or trauma with little or no haemorrhage. When the blood pressure is between 25 and 50 mm. Hg the best form of treatment which we have thus far tested is the intravenous administration of a single dose of pituitrin followed by an adequate quantity of concentrated blood serum. If some time later the blood pressure again starts to fall this treatment may be repeated with benefit. If the shock level of blood pressure is very low adrenaline may prove more effective than pituitrin. If the blood pressure is relatively high—above 50 or 60 mm. Hg—the concentrated serum alone may be quite effective.

Our experiments indicate that, in traumatic shock at least, the injection of a hypertonic fluid is more beneficial than an isotonic one of the same constituents. We believe that the results of these experiments on animals should encourage a trial of pituitrin and concentrated human blood serum on patients suffering from severe traumatic shock.

Summary

Shock in experimental animals was produced by histamine administration, by trauma with extensive haemorrhage, and by trauma with little or no haemorrhage. These three types of shock were successfully treated by the intravenous adminis-

tration of pituitrin and concentrated blood serum. The possible clinical application of these results is pointed out.

Our thanks are given to Mr. C. R. Cowan for his invaluable services, to Dr. Jean P. Fletcher for the blood-protein estimations, and to Dr. J. W. Magladery for the blood-volume determinations.

REFERENCES

Bayliss, W. M. (1918). *Intravenous Injection in Wound Shock*, Longmans, Green, London.
Bazett, M. C. (1918). Sp. Rep. Ser. Med. Res. Com., No. 25, p. 181, London.
Blalock, A., Beard, J. W., and Johnson, G. S. (1931). *J. Amer. med. Ass.*, **97**, 1794.
Bond, D. D., and Wright, D. G. (1938). *Ann. Surg.*, **107**, 500.
Cannon, W. B. (1923). *Traumatic Shock*, D. Appleton Co., New York.
—— and Bayliss, W. M. (1919). Sp. Rep. Ser. Med. Res. Com., No. 26, p. 19, London.
Dale, H. H., and Laidlaw, P. P. (1918). *J. Physiol.*, **52**, 355.
Gregersen, M. I. (1938). *J. Lab. clin. Med.*, **23**, 423.
Hall, W. K. (1938). *Proc. Soc. exp. Biol.*, N.Y., **38**, 46.
Keith, N. M. (1919). Sp. Rep. Ser. Med. Res. Com., No. 26, p. 36, London.
Kennedy, J. A., and Millikan, G. A. (1933). *J. Physiol.*, **93**, 276.
Levinson, S. O., Neuwelt, F., and Necheles, H. (1940). *J. Amer. med. Ass.*, **114**, 455.
Mann, F. C. (1915). *Surg. Gynec. Obstet.*, **21**, 430.
Moon, V. H. (1936). *Arch. Path.*, **24**, 642.
—— (1938). *Shock and Related Capillary Phenomena*, Oxford University Press, London.
Neuwelt, F. (1939). *Amer. J. Physiol.*, **126**, p. 593.
Scudder, J. (1940). *Shock: Blood Studies as a Guide to Therapy*, Lippincott, Philadelphia.
Studdiford, W. E. (1937). *Surg. Gynec. Obstet.*, **64**, 772.
Thalhimer, W. (1939). *Proc. Soc. exp. Biol.*, N.Y., **41**, 230.

SUCCESSFUL CHEMOTHERAPY FOR HAEMOLYTIC STREPTOCOCCAL MENINGITIS AND PNEUMOCOCCAL MENINGITIS IN THE SAME PATIENT

BY

W. OGILVY REID, M.A., B.Sc., M.B., Ch.B., F.R.C.S.Ed.

Late Acting Medical Superintendent, the Downs Hospital (L.C.C.), Sutton, Surrey

AND

JOHN F. LIPSCOMB, M.B., B.S., F.R.C.S.

Acting Deputy Medical Superintendent at the Hospital

There are many published reports of successful treatment of haemolytic streptococcal meningitis with sulphanilamide and other sulphonamides. So striking are the results that one would be justified, when recording the history of the treatment of this disease, in drawing a line between what may be called the pre-sulphonamide and the sulphonamide eras. In the former period the outlook was gloomy in the extreme. Gray (1935), in his classical analysis of the sixty-six cases of recovery from streptococcal meningitis recorded in the whole literature of the subject between 1901 and 1935, gave the mortality rate as 97 per cent. In pneumococcal meningitis the story was even more depressing, the mortality being little short of 100 per cent. With the advent of chemotherapy by sulphonamides this form of treatment was applied to streptococcal meningitis with most dramatic results. Figures such as those published by Appelbaum (1939) have become quite common. He had thirty-five cases with twenty-eight recoveries and seven deaths—the majority of the latter having other complications which might themselves have proved fatal.

Successful chemotherapy in pneumococcal meningitis was uncommon until the introduction of sulphapyridine (M & B 693), although recoveries have been reported by Caldwell and Byrne (1937), Latto (1938), Landon (1938), Young (1938), and others. Hodes, Gimbel, and Burnett (1939) report seventeen cases of pneumococcal meningitis treated with sulphapyridine and its sodium salt, eight recovering. They contrast these results with those obtained at the Sydenham Hospital, Baltimore, before the introduction of the drug: between 1930 and 1936 twenty-seven cases were admitted and all were fatal; from December, 1936, to October, 1938, seventeen patients were treated with sulphanilamide, with one recovery. These authors state that previous to the publication of their paper eight recoveries had been recorded out of fourteen cases of pneumococcal meningitis treated by sulphapyridine alone. If these are added to their own cases we have, with the case described below, thirty-two cases of pneumococcal meningitis treated by sulphapyridine alone, with seventeen recoveries, a rate of 53 per cent. It would appear, therefore, that the introduction of sulphapyridine has so far halved the mortality rate.

A search of the literature has, however, failed to reveal any record of a patient having recovered from two distinct attacks of coccal meningitis bacteriologically different in origin, and the uniqueness of the following case in this respect would appear to justify its publication.

Case History

The patient was a girl aged 17 whose previous medical history was uneventful, except that she had had a mild attack of acute otitis media in childhood which had completely resolved.

FIRST ATTACK (STREPTOCOCCAL MENINGITIS)

On August 24, 1937, the patient was admitted to hospital with acute otitis media following tonsillitis, and six days later a Schwartze mastoidectomy was performed. Progress was satisfactory until September 8, nine days after the operation, when the temperature rose and there was headache and neck stiffness. Her condition rapidly deteriorated; within a few hours unconsciousness supervened with all the signs of a virulent meningitis. Cerebrospinal fluid withdrawn under pressure was turbid, the cell count being 11,040 per c.mm., and haemolytic streptococci were grown on culture. Chemotherapy was started on the 9th, 5 c.cm. of prontosil soluble being injected intramuscularly. On the following day two further injections were given. Mr. Terence Cawthorne converted the Schwartze to a radical operation, and released cerebrospinal fluid under extreme pressure by incision of the dura of the posterior fossa (Neumann's procedure). The next day tablets of sulphanilamide were given, being continued for eight days (see "Dosage").

The second cerebrospinal fluid specimen, withdrawn on September 12, was sterile, and the patient had regained consciousness, although still restless and averse to intervention. By the 16th her condition had improved so considerably that sulphanilamide was discontinued—a total of 27 grammes having been given. Excellent progress was maintained, the cerebrospinal fluid on October 18 being clear and containing only 30 cells. Suddenly, on October 20, severe headache, neck stiffness, photophobia, etc., recurred, the temperature rising more gradually to 102.2°. Drs. Sheldon and Denny Brown and Mr. Cawthorne all confirmed recrudescence of the meningitis, although the cerebrospinal fluid under increased pressure was sterile on culture. Sulphanilamide was again administered, and by October 25, after a further total dosage of 10.5 grammes, all signs of meningitis had once more disappeared. From that date convalescence was uninterrupted, and the girl was eventually discharged on December 17 cured—the affected ear being completely healed and dry.

In due course the patient was able to resume her duties as a nurse, and during the seventeen months which elapsed before her second illness she enjoyed very good health and experienced no sequelae. Recurrent headaches of which she complained were eliminated by the provision of glasses, and she had been free from them for some six months before the second attack.

SECOND ATTACK (PNEUMOCOCCAL MENINGITIS)

On the morning of May 13, 1939, the patient was first seen by one of us, having been complaining of vomiting, vertigo,

and photophobia. She had been perfectly well the day before, but during the preceding night had had slight pain in the right ear, without rise of temperature. Within a few hours she was unconscious, and restlessness was so pronounced that control by morphine was necessary. Intramuscular injections of sodium sulphapyridine (M & B 693 soluble) was promptly instituted, oral therapy being impracticable because of unconsciousness and vomiting. Examination of the affected ear revealed a small abscess postero-superiorly in the depths of the old radical cavity. This was incised and about half an ounce of pus evacuated. The first cerebrospinal fluid specimen withdrawn, under greatly increased pressure, on the morning of May 14 gave a growth of Type E 19 pneumococcus on culture, the second specimen taken the following day being sterile. By the evening of the 16th the patient was conscious and able to recognize people and answer simple questions. She continued to improve, and on May 20 sulphapyridine by mouth was substituted for the intramuscular injections, a previous attempt to institute oral therapy on the 18th having failed as the patient vomited the drug. Convalescence from the meningitis was from this date uninterrupted. An incidental minor disturbance was the development of deep-seated inflammation in the buttocks at the site of the intramuscular injections. A large confluent abscess in the right buttock eventually discharged pus via one or two of the needle tracks and completely cleared up. By June 26 the old radical cavity was again epithelized, healed, and dry, and the patient got up. She was discharged from hospital and went home to convalesce.

Relative Importance of Surgery and Chemotherapy

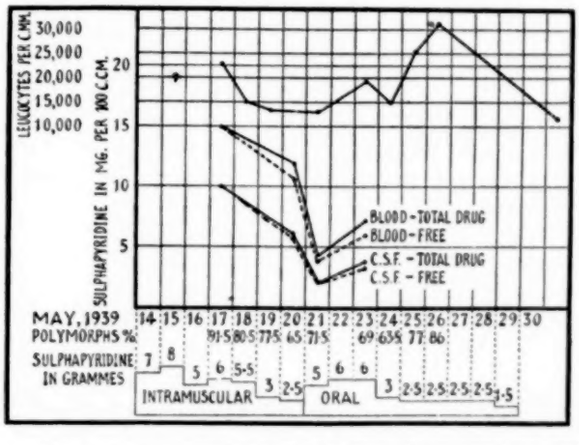
It will be evident that both the attacks of meningitis in the above case were of a very virulent nature. The rapid clinical improvement following on the administration of sulphanilamide in the first attack (streptococcal meningitis) and sulphapyridine in the second (pneumococcal meningitis) leaves little doubt that these drugs turned the scale towards recovery despite the fact that Neumann's operation was also done the first time. As regards operation, it is generally agreed that when there is reason to believe that bone disease is present in the mastoid adjacent to the dura and acting as a focus of infection eradication of the latter is essential, even though we may be shutting the stable-door after the horse is stolen. In this connexion it is interesting to note the difference between the assumed mode of infection of the meninges in the two attacks. As has been stated by Turner and Reynolds (1931), otogenic meningitis may result from infection via the blood stream, from adjacent bone disease, or through natural spaces or gaps resulting from injury. In the first attack, described above, the second route would appear to be the most likely from the sequence of events as recorded—namely, acute otitis media, cortical mastoidectomy ten days later, and then in a further ten days radical mastoidectomy; that is, apparently, a relatively slow progress to the meninges from the original focus of infection in the middle ear. Bone involvement calling for radical surgery is what one would expect and what was in fact demonstrated. On the other hand, the fulminating onset in the second attack suggests a more direct route of infection—either via the blood stream from the abscess in the old radical cavity or through the weakened barrier resulting from extensive bone removal at the previous operation. In support of this latter view Cawthorne (1939) refers to three cases in his own experience in which a second attack of streptococcal meningitis occurred and large areas of dura had previously been exposed and were lying in direct contact with the middle-ear cleft. If this were so, extensive surgery would not be called for, and it should suffice to evacuate pus from the abscess referred to and provide free drainage. This was, in fact, all that was done in our case, reliance being placed on intensive chemotherapy, with the highly satisfactory result recorded. Chemotherapy is tending to stay the surgeon's hand to some extent, even when meningitis has actually developed, and T. B. Layton (1939) has said that the time may soon come when our practice will be to treat the meningitis first with chemotherapy and deal with the mastoid disease by operation during the convalescent period. Perhaps we should add that another possible route of infection in the second attack in our patient—namely, via the labyrinth—was ruled out, despite the suggestiveness of early labyrinthine symptoms, by the fact that the girl was subsequently found to have an active labyrinth and some hearing on that side.

In summing up the question of the relative importance of chemotherapy and surgery in the treatment of this condition we may quote the view of Long and Bliss (1939). They said: "If, however, a septic focus is present which is not draining well, and if it seems to the considered judgment of the surgeon that the focus can be drained without the operative procedure's immediately endangering the life of the patient, then sulphanilamide should be started and the focus drained."

Dosage

The dosage of sulphapyridine for the pneumococcal infection was regular and controlled in comparison with the rather haphazard administration of the sulphanilamide, which, owing to the general lack of knowledge of that aspect of chemotherapy, was a common feature at the time of treatment of the first attack. Prontosil soluble was first given parenterally (15 c.cm.), and, later, sulphanilamide was given orally (27 grammes spread over eight days). The dosage was low, the administration was not regular or sufficiently prolonged, and the level obtained in the cerebrospinal fluid was not determined. This may explain the recrudescence of the meningitis six weeks later, for which a further 10.5 grammes of the drug in tablet form was given over a period of three days. The dosage was regarded at the time as adequate in view of the rapid clinical improvement and of the fact that the cerebrospinal fluid was sterile in twenty-four hours.

For the attack of pneumococcal meningitis in May, 1939, sulphapyridine was used. In all, 68.5 grammes



was given over a period of sixteen days, and as the patient was vomiting, the soluble sodium salt was administered intramuscularly—37 grammes being given in the first seven days. On the fifth day an attempt was made to substitute tablets, but vomiting occurred despite crushing the tablets in milk and frequent administration of sodium bicarbonate.

This dosage corresponds approximately to that suggested by most writers—namely, 1 gramme per 20 lb. of body weight per twenty-four hours, given at four-hourly intervals. Estimations of free and conjugated sulphapyridine in blood and cerebrospinal fluid were done for us by Messrs. May and Baker, the method of Baines and Wien (1939) being employed, and they have incorporated their results along with the dosage of the drug in the form of the graph shown. It will be seen that on the first estimation the figures for blood and cerebrospinal fluid were respectively 15 and 10 mg. per 100 c.cm. This was after 23 grammes had been given. Dosage was then kept at 0.5 gramme four-hourly. In all remaining estimations the cerebrospinal fluid content of free sulphapyridine was approximately half that of the blood, as has been found by other writers.

Tolerance and Blood Changes

Our patient showed very little intolerance to sulphanilamide or sulphapyridine. During the attack of streptococcal meningitis cyanosis was pronounced, but caused no distress; and during the phase of aseptic meningitis there was a maculo-papular eruption situated mostly on the exposed portion of the body, but this cleared up rapidly.

Cyanosis was present with the attack of pneumococcal meningitis, but caused no distress. At the site of the injections of the sodium sulphapyridine there was a deep-seated inflammation, with later formation of pus, which, however, did not give rise to superficial ulceration but discharged along the needle-puncture tracks and cleared up in about three weeks. Intragluteal administration was continued for much longer than is usually advised, but this was thought to be justified in view of the gravity of the patient's condition and the difficulties that would have been encountered in intravenous injection.

During the course of the pneumococcal meningitis, when large doses of sulphapyridine were being given, full blood counts were done daily, and we should like to stress the behaviour of the leucocytes in a case responding to treatment which did not have to be prolonged. The total count dropped from 23,000 per c.mm. on the fourth day to 13,000 on the seventh day, a fall of 43.5 per cent.—a usual finding in all successfully treated cases. The fall in granulocytes was 25 per cent.—from 90 per cent. to 65 per cent.—when 36 grammes of sulphapyridine had been given, which suggests that on occasion granulocyte production may temporarily be disturbed even when treatment is of short duration. Against this reasoning is the fact that the infection was so very severe that it would undoubtedly have proved fatal in the days before sulphonamides; adequate comparative data do not therefore exist.

That the leucocytes were able to react well is shown by the rise on the thirteenth day to 31,000 and almost 86 per cent. granulocytes after 59.5 grammes of sulphapyridine had been given. This is due to the inflammation in the buttocks from the injections, and is analogous to the response seen in cases of pneumonia complicated by empyema.

There was a mild anaemia of the secondary type during the convalescent stage, which rapidly responded to iron therapy. Macroscopic haematuria was not observed during sulphapyridine therapy.

Cerebrospinal Fluid

During both attacks cerebrospinal fluid was withdrawn initially for confirmation of diagnosis, and thereafter only when considered advisable to reduce pressure. It is interesting that drainage by lumbar puncture was called for on only four occasions in the attack of streptococcal meningitis and seven occasions in the attack of pneumococcal meningitis. Fluid was withdrawn once during the recrudescence. This accords with the practice of others since the introduction of chemotherapy for meningitis (Banks, 1939). It is noteworthy that at no time did the appearance of the fluid withdrawn approximate to the thickly purulent type obtained from cases of pneumococcal meningitis before the introduction of chemotherapy. These facts are further evidence of the satisfactory response of the infection to the drug, and in this connexion it is striking that in both illnesses the cerebrospinal fluid was sterile on culture at the second examination within twenty-four hours, and the cell count had fallen from 11,040 to 3,200 per c.mm. in the first attack and from a similar number (not recorded) to 2,000 per c.mm. in the case of the second attack.

REFERENCES

Appelbaum, E. (1939). *Laryngoscope*, **49**, 30.
Baines, E. J., and Wien, R. (1939). *Quart. J. Pharm. and Pharmacol.*, **12**, 4.
Banks, H. S. (1939). *Lancet*, **2**, 921.
Caldwell, J. R., and Byrne, P. S. (1937). *British Medical Journal*, **1**, 1204.
Cawthorne, T. (1939). *J. Laryng.*, **54**, 444.
Gray, H. J. (1935). *J. Amer. med. Ass.*, **105**, 92.
Hodes, H. L., Gimbel, H. S., and Burnett, G. W. (1939). Ibid., **113**, 1614.
Landon, J. (1938). *British Medical Journal*, **1**, 844.
Latto, C. (1938). Ibid., **1**, 566.
Layton, T. B. (1939). *J. Laryng. Otol.*, June, 1939, 344.
Long, P. H., and Bliss, E. M. (1939). *The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds*, p. 167, Macmillan, New York.
Turner, A. L., and Reynolds, F. E. (1931). *Intracranial Pyogenic Disease*, Oliver and Boyd, Edinburgh.
Young, F. (1938). *British Medical Journal*, **2**, 286.

TREATMENT OF PNEUMOCOCCAL MENINGITIS WITH SULPHAPYRIDINE

BY

STEPHEN T. FALLA, M.D., M.R.C.P.

Physician, Norfolk and Norwich Hospital

The disappointing results obtained in treating pneumococcal meningitis with moderate doses of sulphapyridine (M & B 693) led to the use of massive doses of the drug at the onset of treatment in the two cases recorded below.

Case 1

A boy aged 7 was admitted to the Jenny Lind Hospital on September 30, 1939, on the third day of his illness. On September 28 he had complained of headache, had been seen to be drowsy, and had vomited once. On admission he was drowsy but conscious. He complained of pain over the vertex. The temperature was 101° and the pulse rate 100. There was neck rigidity, and Kernig's sign was positive. No physical signs were present in the chest, and the ears were normal. Lumbar puncture showed turbid cerebrospinal fluid under pressure. There were 2,500 cells per c.mm., most of them being polymorphs. Gram-positive diplococci were identified in the film.

From 10 p.m. on the day of admission he was given an injection of 3 c.cm. (1 gramme) of soluble sulphapyridine every hour for twenty-hours, and then 3 c.cm. every four hours. He vomited frequently during the first night, and next day was delirious and very noisy. Lumbar puncture showed turbid cerebrospinal fluid with 4,000 pus cells per c.mm. No organisms were found. On the third day in hospital he was still extremely ill, and difficulty was experienced in keeping him in bed. The cerebrospinal fluid was turbid but not under pressure. His delirium was controlled with paraldehyde, and he was given oesophageal feeds. The temperature had become normal twenty-six hours after admission and remained so during the third and fourth days. From noon on

the third day sulphapyridine was again given in doses of 1 gramme every hour for twelve doses. On the fourth day his condition had improved a little by the evening, but his urine was bright red and remained so for two days. On the fifth day there was definite improvement, but he was still delirious at times. He was pale and cyanosed, and the blood count showed 4,900,000 red cells per c.mm., 64 per cent. haemoglobin, and 12,200 white cells per c.mm. Sulphapyridine was discontinued on the morning of this day, when the total dose had reached 48 grammes, the drug having been given in doses of 1 gramme three-hourly or 1 gramme four-hourly on the fourth and fifth days. On the sixth day he was able to talk rationally and said he felt very much better.

The patient continued to do well until the ninth day, when he complained of pain over the bridge of the nose. A similar pain, he said, had been present on the first day of his illness. He also complained of frontal headache and there was slight neck rigidity. The temperature, which was 99° from the evening of the sixth day in hospital to the evening of the eighth, rose to 103° during the day. The cerebrospinal fluid was quite clear macroscopically, but contained 40 polymorphs per c.mm. No organisms were seen, but Type I pneumococci were obtained on culture. Sulphapyridine was given in doses of 1 gramme six-hourly and later 1 gramme three-hourly until the fourteenth day, the total dose during this relapse being 20 grammes.

The child never became seriously ill during the relapse, and on the eleventh day he was free from symptoms. His temperature subsided from 103° on the ninth day to 99.5° on the eleventh day, but rose to 100° till the fifteenth day. He tended to run a temperature of 99° from the fifteenth to the twenty-sixth day, when it came down permanently. The ear, nose, and throat system had appeared normal clinically throughout the illness, but a radiograph of the sinuses on the sixteenth day revealed opacity of the right antrum, and the next day antrostomy on this side by Mr. N. S. Carruthers produced thick pus. No organisms were seen in the pus, and it was sterile on culture.

On discharge from hospital at the end of five weeks the child was alert mentally. He had been taking iron since the fifteenth day, when his blood count had read: 3,120,000 per c.mm.; haemoglobin, 58 per cent.; and white cells, 12,600 per c.mm. On discharge the red cells were 4,600,000; haemoglobin, 78 per cent.; and white cells, 5,600.

On November 10, six weeks after the onset of treatment, he attended as an out-patient and appeared well. The blood count showed red cells, 4,800,000; white cells, 7,000; and haemoglobin, 82 per cent. The differential count gave 50 per cent. polymorphs, 44 per cent. lymphocytes, and 6 per cent. monocytes. On January 3, 1940, the child was seen again and still appeared very well.

Case II

This patient, a boy aged 10, was admitted to the Norfolk and Norwich Hospital on October 1, 1939. He had had a discharging right ear for some years, and this discharge was stated to have increased ten days before admission. On the day before admission he complained of severe headache at the back of the head, vomited three times, and became unconscious. On arrival he was semiconscious, with a temperature of 104° and a pulse rate of 120. Neck rigidity was present and Kernig's sign was positive. The cerebrospinal fluid was cloudy, and contained many polymorphs and pneumococci, which were identified but not cultured. From an hour after admission soluble sulphapyridine was given in doses of 3 c.cm. each hour, but the boy became more restless and died after being twenty hours in hospital. A post-mortem examination was not made.

Discussion

Five fatal cases of pneumococcal meningitis treated with sulphapyridine had been seen before these two patients. A typical unsuccessful case was that of a woman, aged 39, admitted to the Norfolk and Norwich Hospital on January 16, 1939, on the second day of her illness. There was no response to sulphapyridine in doses of 2 grammes every four hours, and she died at the end of four days in hospital. A post-mortem examination showed extensive purulent meningitis, but no primary focus was detected. The two cases described here were treated with such massive doses because it was felt that failure in the past might have been due to the use of too small a dose. The possibility of producing toxic effects with the drug was given second place because of the seriousness of the condition and the fatal issue of cases treated in the past, when no patient had recovered. A survey of the literature provides some support for the use of a large dose as soon as the patient comes under treatment. Maclean, Rogers, and Fleming (1939) describe experiments which prove that pneumococci can, in an infected animal treated with sulphapyridine, readily establish a tolerance or fastness to the drug. Ross (1939) described a case of pneumococcal meningitis treated with sulphapyridine in which the culture of the pneumococcus (Type I) shortly after the onset of treatment was sensitive to sulphapyridine, whereas the culture obtained at the post-mortem examination was insensitive. Large doses of sulphapyridine had been used in this case. The exact dose in the first twenty-four hours is not stated, but 2 grammes was given on the first day of treatment and 10.5 grammes on the second day. No sulphapyridine was demonstrated in the cerebrospinal fluid on the second day.

The reports of cases successfully treated with sulphapyridine (see table) show great variation in the amount used in the first twenty-four hours and in the total dose. The statistics in this table are not sufficient for one to arrive at a conclusion as to whether the type of pneumococcus affects the response to treatment with sulphapyridine. Hodes, Gimbel, and Burnet (1939) believe that response is good in all the types they met with. It will be noted that cures were obtained in cases in which treatment was started on the second and third days of the illness.

Table showing Cases of Pneumococcal Meningitis Successfully Treated with Sulphapyridine

Author	Age of Patient	Type of Pneumococcus	Dose in first 24 hrs. (grammes)	Total Dose (grammes)	Day of Illness at Onset of Treatment
Cable (1939)	7	X	2	15	3rd
Robinson (1939)	3	I	1.75	3	2nd
Reid and Dyke (1938) ..	7	—	3.5	22.5	2nd or 3rd
McAlpine and Thomas (1939)	24	—	5.5	25.5	3rd
MacKeith and Oppenheimer (1939)	30	III	4	70	3rd
Raman (1939)	34	—	9	155	3rd
Dunlop and Laurie (1939)	9	IV		40.5	6th

Note.—(1) The dose for the first twenty-four hours is approximate. (2) Only cases in which sulphapyridine was used are included, since this is now the accepted form of chemotherapy.

The number of cases reported in which sulphapyridine has been used unsuccessfully is not sufficient to allow of comparison of the dose used in the first twenty-four hours with that used in the successful cases.

The table shows cases in which the dose in the first twenty-four hours seems very small in comparison with the total dose. Considering the extreme seriousness of the diagnosis a much larger dose in the first twenty-four hours would appear justifiable, and although these cases recovered on a smaller dose, it is possible that some of those that ended fatally might not have done so if they

had received more intensive treatment at the outset. The average dose of sulphapyridine given to the adults in these cases at the onset is, in fact, less than that advocated by Banks (1940) for adults with meningococcal meningitis, whereas the more serious nature of pneumococcal meningitis would justify the use of larger doses if there is doubt as to the optimum dose, as there has been in the past. In contrast with the small initial dose in some cases, a very large total dose had occasionally to be used. The clinical accounts of some of these cases suggest that a much larger dose at the beginning might have cleared up the pneumococcal infection sooner, so that the total dose needed might not have been greater. McAlpine and Thomas (1939) believe that large doses are not necessary. The amount of sulphapyridine in the cerebrospinal fluid did not exceed 3 mg. per 100 c.cm. on the second day in their successfully treated case. At present, however, the records of the quantity of sulphapyridine in the cerebrospinal fluid in successful cases are too scanty to allow the use of this as a criterion in arriving at the optimum dose. It may be that this ideal will never be attained, since some cases are primary and others are secondary to aural or pulmonary infections, and it is not always apparent at the onset which type of case is being dealt with. In Case I, for example, there was pus in the antrum, but at a late examination it was proved not to be pneumococcal. It would be difficult to say how much sulphapyridine was "necessary" in this case, but it is significant that pneumococci were grown from the cerebrospinal fluid on the ninth day after large doses had been used.

The mortality of pneumococcal meningitis at the present moment is not easy to assess. The incidence of the disease can be gauged approximately from the experience of the Dudley Road Hospital, Birmingham (Cable, 1939), where thirty-nine cases were admitted in three years. Reports of only fourteen cases successfully treated in this country have been found since the advent of sulphapyridine. Seven of these cases had been given sulphapyridine alone. MacKeith and Oppenheimer (1939) quote five cases, with two recoveries. These considerations, and the personal experience of six cases with one recovery, indicate that the mortality rate is still very high at the present time.

Hodes, Gimbel, and Burnett (1939) treated seventeen patients, of whom four died in the first twenty-four hours and eight recovered completely. The meningitis was secondary to infection of ears, lungs, or eyes in twelve cases, and was apparently primary in five cases. One patient developed agranulocytosis, but recovered. The first six patients were treated with sulphapyridine by mouth in moderate doses, but it was found to be absorbed irregularly, as judged by the concentration in the blood and cerebrospinal fluid, and later cases were treated with sulphapyridine by mouth combined with intravenous injections of sodium sulphapyridine. The last four cases in the series reported were treated with large doses of sulphapyridine by this combined method, and all recovered. The authors believe that a concentration of 10 to 15 mg. of sulphapyridine per 100 c.cm. of cerebrospinal fluid should be maintained. The dose they now recommend is as follows. When the diagnosis is made older children and adults are given from 6 to 12 grammes at once by mouth, and a quarter of this amount every six hours, the full dose being continued by mouth until several successive cultures of the cerebrospinal fluid are sterile. In addition a 5 per cent. solution of sodium sulphapyridine is given intravenously, starting with 0.1 gramme per kg. of body weight at once and continuing with 0.03 gramme per kg. every six hours until two successive lumbar punctures are sterile. In other words, an adult weighing 12 stone might receive 34 grammes in the first twenty-four hours.

Conclusion

In the absence of definite evidence of the optimum dose of sulphapyridine in the treatment of pneumococcal meningitis large doses should be used from the beginning. The soluble form is recommended, whether by intramuscular injection or, as Hodes, Gimbel, and Burnett recommend, intravenously. In every case of meningitis the organism should be ascertained without delay, so that, if it prove to be a pneumococcus, treatment with larger doses than would appear justifiable for meningococcal meningitis may be started. Some cases have got better with moderate doses, while others relapse after very large ones. It is possible that the use of large doses in the first twenty-four hours might reduce the present high mortality by curing patients who would die on moderate doses.

Addendum

Another patient with pneumococcal meningitis has been successfully treated with sulphapyridine. He was a man of 42 who was known to have had a chronic infection of his antra and sinuses. He attended the out-patient department of the Norfolk and Norwich Hospital on April 5, 1940, complaining of headache of a week's duration. There had been no vomiting and his temperature was normal. He was admitted under Mr. N. S. Carruthers on the same day, and a bilateral antrostomy with opening of frontal sinuses was done.

On the day after the operation he complained of more severe headache and vomited several times. His temperature rose to 102°. Neck rigidity was now present. A lumbar puncture done that evening showed a turbid cerebrospinal fluid which contained pneumococci. These were not typed. Treatment with sulphapyridine was started at once, doses of 9 grammes a day being used for the first three days. The man became very ill, so on the fourth day treatment with 24 grammes of sulphapyridine in each twenty-four hours was started. The drug was injected intramuscularly every three hours, since there is no theoretical advantage in giving hourly injections, as was done in the former cases. After treatment for two days with these larger doses the patient was still very ill, but his cerebrospinal fluid was clear and contained no pneumococci. He has since made a good recovery.

REFERENCES

Banks, H. S. (1940). *Lancet*, **1**, 42.
Cable, J. V. (1939). Ibid., **2**, 73.
Dunlop, H., and Laurie, J. (1939). Ibid., **1**, 1437.
Hodes, H. L., Gimbel, H. S., and Burnett, G. W. (1939). *J. Amer. med. Ass.*, **113**, 1614.
McAlpine, D., and Thomas, G. C. (1939). *Lancet*, **1**, 754.
MacKeith, R. C., and Oppenheimer, G. (1939). Ibid., **1**, 1099.
Maclean, I. H., Rogers, K. B., and Fleming, A. (1939). Ibid., **1**, 562.
Raman, P. S. (1939). Ibid., **1**, 1101.
Reid, G. C. K., and Dyke, S. C. (1938). Ibid., **2**, 619.
Robinson, G. B. (1939). *British Medical Journal*, **1**, 844.
Ross, R. W. (1939). *Lancet*, **1**, 1207.

The vascular state of the hands of five patients with Raynaud's disease has been studied by M. G. Mulinos, I. Shulman, and I. Mufson (*American Journal of Medical Sciences*, June, 1939). Treatment with histamine iontophoresis and the administration of 60 to 120 mg. of papaverine hydrochloride intravenously twice weekly has led to an increase in the blood flow in the hand and subsequently to the complete alleviation of the cyanosis and pain from exposure to cold and to the healing of trophic lesions. No addiction and very little cerebral depression followed the administration of papaverine despite the continuation of this treatment over six to eight months.

CLINICAL EXPERIENCE IN ELECTRICALLY INDUCED CONVULSIONS

BY

FRANCIS E. FOX, B.A., M.R.C.S., L.R.C.P.
Medical Superintendent, Brislington House, Bristol

From the dim past psychotic patients have been subjected to various forms of treatment with the object of creating a shock to their central nervous system; some of these methods were no doubt barbarous in the extreme. In more recent times shock treatment has been elaborated. Insulin, cardiazol, triazol, etc., have had their turn, and even these have had their risks and terrors.

The therapeutic results of the various shock treatments seem, in the light of experience, to vary little, and it may be supposed that when a remission occurs it is due to some effect common to various methods. For this reason the recently introduced treatment by electrically induced convulsions has aroused interest not so much by its results as by its somewhat dramatic details. It seems worth while, however, to put on record a purely clinical account of the results obtained in a small series of cases. There is no need to describe the method and apparatus here, since this has been done recently by Fleming, Golla, and Walter (1939), Shepley and McGregor (1939), and others.

It is only by consideration of individual case histories that patients suitable for this treatment can be selected: it is by no means a panacea for all types of mental disorder. The following are the cases I have taken for treatment.

Case 1.—A woman aged 35 with katatonic stupor had been under my care for nearly two years and had failed to react to insulin treatment. She was at all times resistive, difficult with her food, and sometimes cataleptic. She had never been really robust mentally. During these two years she had not had a satisfactory remission. After her first electrically induced convulsion a definite change was noted: the mists of confusion seemed to have begun to lift. After three treatments she was taking her food naturally and with a considerable degree of relish; she began to take an interest in her personal appearance, and was able to converse normally. In all she was subjected to fourteen shocks. In the course of this treatment there was a period when for about a week she became rather exalted and showed signs of a manic nature; but this subsided, and she left my care two days after the final shock. During this period of treatment she put on nearly a stone in weight. I understand that after a lapse of three months she still remains stable.

Case 2.—A man aged 35 was suffering from a psychotic state of anxiety which rapidly progressed into a resistive stupor—a fairly familiar type in mental hospitals. He was suicidally inclined and had delusions of unworthiness, until he became too confused to express himself in articulate speech. He had to be spoon-fed, and was passively antagonistic to all attention and faulty in habits. He was admitted here in this state shortly after the outbreak of war. He was at first given a course of modified insulin treatment, which alleviated his condition. He relapsed and became rigidly negativistic and completely indifferent to all his bodily needs. He was taken to the Burden Neurological Research Institute, and after his initial shock during the first day was very drowsy; the next morning he dressed himself and began to take his food naturally. He continued to progress satisfactorily, and when he had been given thirteen shocks he left my care, having put on 13 lb. in weight. After two and a half months I hear that this remission is being maintained, and that he is shortly going to take up the work he had to relinquish last summer.

Case 3.—A woman aged 25 was admitted here last November. She had not been well mentally for over three years and was rapidly deteriorating. Before admission she had been treated surgically for the removal of an ovarian cyst. She appeared to be a case of schizophrenia. She was silent, morose, "shut in," and at times violently impulsive. She received eleven shocks, when she became excited and maniacal, and owing to the difficulty of transport during the "freeze-up" in the early part of this year I was unable to take her to the institute for treatment. Since the weather has improved she has had further electrical treatment, and is now well-behaved and taking her food naturally. She has put on 12½ lb. in a month. It has now been decided to stop the electrical treatment and substitute endocrine injections of dimenformon daily. Her progress both mentally and morphologically is satisfactory.

Case 4.—A well-built woman aged 27, nearly six feet in height, was admitted here in 1933. She was a case of schizophrenia, hallucinated, incoherent, degraded, and dangerously violent. There was a very bad family history of insanity. During these years there had been passing phases when for two or three days she had been well-behaved and amiable. These have been few and far between, and it was during one of these short-lived phases that I was able to take her to the institute for treatment. By so doing this period of amiability was extended to nearly a month, when, on the onset of menstruation, which had been very irregular and practically absent for seven years, she became too difficult to take to the institute. The previous state of affairs seemed to have become re-established. After just over ten days she spontaneously asked me to take her for some more electrical treatment. She is now being treated in the same way, with the addition of dimenformon injections to ward off, if possible, the complication of menstrual difficulties. She is careful of her personal appearance, reads the papers, knits, and takes a general interest in life again. Oddly enough, she at first always dated her letters 1933, the year she originally broke down mentally. She would not believe or understand that she has been under care here for over seven years. She has had seventeen shocks in all, and for a month has kept very well mentally. She has put on exactly one stone in weight during this treatment.

Case 5.—A man aged 25 with depressive stupor came to me shortly after the outbreak of war. He is a bachelor living on a small-holding in the country. He was told he would have evacuees to house and look after. This precipitated a nervous breakdown of considerable severity. There had been a previous attack two years before, but of much slighter intensity. He came to me in a state of psychotic anxiety somewhat similar to that of Case 2. He would not converse, and during the period of three months before electrical treatment he never spoke a coherent sentence, except for a few stammering efforts. He was resistive and had to be spoon-fed. The anxiety state had now passed into a resistive stupor. He was taken to the institute. After his first shock, and when he had recovered from the drowsy state which always follows this treatment, he was able to converse with me coherently without a trace of a stammer and quite rationally. He admitted that he was feeling all right, but could not understand what had happened. After ten shocks he left my care, having gained 9½ lb. in less than a month. He remains well after an interval of nearly two months.

Case 6.—I consider this case, that of a woman aged 63, to be the most remarkable in the series. The patient had been under my care for just over two years with well-established agitated melancholia. During the whole of this period she had been grossly faulty in her habits, had to be spoon-fed, and was resistive and generally obstructive. She had been confined to her bed, where she emitted almost ceaselessly a sound like the whining of a puppy shut away from its mother. She was considered fit to undergo shock treatment, although it was felt that there was a risk owing to her weakened bodily condition. After three shocks she began to feed herself. Her habits were less faulty and the whining noise diminished in volume and frequency. She has now had twelve shocks, and is pleasant in her manner and interested in her personal appearance. Her habits are now correct. She has recently left my care to live with her husband at home. During this treatment she has gained 1 st. 6½ lb. In this case there is

undoubtedly some degree of dementia, but this may have been present before her original breakdown became acute over two years ago. She dates everything from the year 1938, the year she started her illness. She also states that she had no idea that she had been under my care for two years.

Case 7.—A youth aged 18 came to me a few weeks ago. He was a typical early case of schizophrenia, and was restless, frightened, and deluded. He stated that he had committed a serious crime and wanted to hand himself up to the police. He had apparently been wandering about aimlessly at home and was a cause of great anxiety to his parents. On the day of his first visit to the institute he was under the impression that I was taking him to the Old Bailey. After three shocks he became more reasonable, and now, after ten shocks, he is practically back to his normal. He no longer looks terrified. His conversation is rational, and he appears to be bright and cheerful, such as one would expect from a boy of his age. He readily agrees that he had been behaving absurdly and that he had talked a lot of nonsense. It is assumed that after a few more shocks, making a total of fifteen to twenty, he will be able to return home. He has put on a stone in weight since admission.

Conclusions

I think it as well to classify the results of the above cases from the social standpoint, according to the degree of remission achieved, as follows. Class A: a complete return to normality and ordinary social intercourse outside a mental hospital. Class B: a marked improvement in behaviour, sufficient to permit the patient to enter into the higher spheres of mental hospital life. Class C: no change, the patient still requiring constant attention. Cases 1, 2, 5, 6, and 7 can be placed in Class A, although Case 6 may be a candidate for Class B, as this patient shows signs of dementia to a small degree; but she is quite suited to spend the eventide of her life at home with her husband. Cases 3 and 4 are at present in Class B, but would appear to be not far off the Class A standard.

It will be seen that the results are entirely satisfactory, admitting at the same time that the cases were specially selected for treatment. Except for the period of the "freeze-up," when it became impossible for me to transport these patients to the institute, they have all been treated with three shocks a week. The fact that shocks were administered three times weekly may be of some importance, since other groups of cases which received only two shocks a week have not fared so well. It is possible that the method of Sogliani (1939a, 1939b), who gives several shocks a day, may produce even better results in patients of suitable physique. When shocks are given only twice a week one has a definite impression of "missing the boat" by reason of the long interval.

The great advantages, in my opinion, over other forms of convulsion therapy are:

1. The patient suffers no unpleasant memories.

2. The loss of consciousness is instantaneous as soon as the lever is pressed.

3. The possibility of fractures seems to be remote, provided certain precautions are taken. The precautions are: (*a*) A suitable resilient gag is placed between the teeth (of course after any dentures have been removed). The best article is a rubber ring, such as is sold at dog requisites shops; this keeps the tongue away from the teeth, and also has a certain amount of "give" during the tonic stage of the convulsion. (*b*) The patient should be lying flat on the back, so that the possibility of a compression fracture of the bodies of the vertebrae is lessened. It was found that a resistive patient often would not lie flat after the insulated electrodes had been placed around the forehead. To overcome this a small non-convulsive shock was administered which made it possible for the patient to be straightened out and the gag placed in position, when the major shock was given.

4. The willingness of the patient to co-operate in this form of treatment after the first two or three shocks.

5. The celerity of the treatment. The patient can be treated in his everyday apparel, provided any constricting clothes are loosened around the neck and chest and the footwear is removed.

6. The appetite is definitely stimulated and the body weight rapidly increased.

7. The chronic constipation associated with these types of psychosis disappears early in the treatment.

8. The portability of the complete apparatus.

9. The manipulator need not be a highly qualified electrical technician.

Although the ultimate prognosis of this form of treatment is problematical at the present time, there seems no reason why the remissions should not be prolonged indefinitely by "maintenance" shocks—say three in a single week—if the patient is found to be relapsing. I feel certain that patients would submit to this far more readily than they would undergo the terrors of cardiazol or insulin; besides, this could be undertaken in their own homes, provided suitable electricity were available. The contraindications to shock treatment would seem to be arterial and cardiac diseases, high blood pressure, and intracranial diseases.

Summary

The treatment of certain suitable cases of psychosis by electrically induced convulsions is discussed.

Records are given of seven selected cases which received shock treatment for various psychotic disorders.

The results of the use of this method are classified and its advantages over other forms of convulsion therapy are enumerated.

I am deeply indebted to Professor F. L. Golla, the director of the Burden Neurological Research Institute, Bristol, for the courtesy shown me, to Mr. Grey Walter, and to the staff of the Institute, who have given me every facility in the treatment of the patients whom I have taken there.

REFERENCES

Fleming, G. W. H. T., Golla, F. L., and Walter, W. G. (1939). *Lancet*, **1**, 1353.
Shepley, W. H., and McGregor, J. S. (1939). *British Medical Journal*, **2**, 1269.
Sogliani, G. (1939a). *Rass. Studi Psichiat.*, **28**, 652.
—— (1939b). *Note Psichiat.*, Pesaro, **68**, 2.

AXIAL ROTATION OF THE PREGNANT UTERUS

BY

G. SHEDDEN ADAM, M.B.Syd., F.R.C.S.Ed., M.R.C.O.G.

The diversity of lesions which, in the pregnant woman, may cause acute abdominal pain with uterine tenderness and rigidity, vomiting, and increasing prostration, was stressed by Barnett and Harris in the *Journal* for July 22, 1939 (p. 167). Wide though this diversity may be, the essential point is to determine, so far as possible, whether the lesion is extra-uterine and therefore probably requiring surgical intervention, or intra-uterine and perhaps amenable to sedatives or to some obstetrical measure. There must remain, however, cases in which the diagnosis is in doubt until laparotomy is performed, and an occasional case in which the lesion, though uterine, must be dealt with surgically.

Such lesions as perforated peptic ulcer, acute pancreatitis, and acute cholecystitis can usually be recognized by their distinctive features. Barnett and Harris found, however, that pregnancy complicated by acute suppurative intra-abdominal lesions, though uncommon, is likely to lead to diagnostic uncertainty because of a superficial resem-

blance to concealed accidental haemorrhage, even to the apparent rising of the level of the fundus uteri. Fortunately it is seldom that such a distinction has to be made, but I am prompted to report a case of axial rotation of the pregnant uterus which illustrates still another lesion in which a diagnosis of concealed accidental haemorrhage could only be excluded with difficulty.

Although minor degrees of torsion of the longitudinal axis of the pregnant uterus are probably not uncommon, progressive and persistent torsion sufficient to produce constitutional symptoms and to require laparotomy for its correction appears to be less frequent, for there is no recent record of such a case in the literature.

Case Record

Clinical History.—The patient, a healthy primigravida aged 30, had had a hitherto uneventful pregnancy, there being no evidence of hypertension, albuminuria, or other abnormal features. On December 1, 1938, when approximately thirty-three weeks pregnant, she began to suffer from severe generalized abdominal pain, and uterine tenderness which, however, was not localized. The onset was gradual, with some vomiting, weakness, and faintness, but no actual collapse. There was no history of any recent strain, twist, or fall, nor was there any haemorrhage per vaginam. Previous examination had shown the child to be presenting by the vertex as an L.O.A. At the onset of the pain these negative findings in regard to possible malpresentation, hypertension, or albuminuria were confirmed. Symptomatic treatment, including sedation by morphine, gave some relief. There was no worsening of the general condition and little change in the clinical picture. By December 5, however, the abdominal pain and uterine tenderness had become constant in spite of sedatives, the outline of the uterus was clearly definable through the abdominal wall, and the whole organ was tense and tender, but there were no rhythmic contractions or other signs to suggest that labour had begun.

On the basis of a provisional diagnosis of concealed accidental haemorrhage, and with the intention of inducing labour, the membranes were artificially ruptured and a considerable quantity of liquor allowed to escape. Not only did the patient fail to come into labour, but the uterine pain and tenderness increased and the foetal heart sounds could not be detected. She was now becoming considerably distressed, though her general condition remained satisfactory and there was no unequivocal evidence of internal haemorrhage. After a further short period of sedative treatment she was admitted to the Brisbane Women's Hospital. Her condition generally was as described above—the uterus standing out even more prominently through the abdominal wall. There was no evidence of a retraction ring. The cervix uteri was not thinned out, there was no dilatation of the os, and the presenting part was not engaged. There was no bleeding per vaginam.

Operation.—It was decided that the only effective treatment at this stage would be by laparotomy and Caesarean section, even though no positive pre-operative diagnosis could be made. In spite of the ruptured membranes an abdominal incision as for the classical operation was used, since it was felt that the operative measures to be adopted would depend largely on the findings revealed by laparotomy. This choice of incision was a fortunate one, as the first structures presenting in the wound were the left Fallopian tube, the left round ligament, and the left lateral aspect of the uterus. The gravid organ itself was tense but not markedly congested. The condition was evidently an axial rotation of the pregnant uterus in its longitudinal plane, the direction of rotation being clockwise and the extent approximately 90 degrees. The actual site of the torsion was apparently in the lower uterine segment. The correction of the condition was facilitated by eventrating the pregnant uterus. This manœuvre, moreover, in combination with the subsequent packing off of the peritoneal cavity, made the classical operation reasonably safe in the circumstances. As now expected, there was no evidence of concealed accidental haemorrhage or other abnormality than the one described. There was about 50 c.cm. of free blood-stained fluid in the pouch of Douglas.

The child was delivered alive and, although obviously premature and suffering from asphyxia pallida, it responded satisfactorily to the routine treatment for such cases. It died, however, some twelve hours later. The patient herself made an entirely satisfactory recovery, complicated only by a saprophytic type of intra-uterine infection, as exhibited by a pyrexia rising to 102° F. and a profuse offensive lochial discharge during the third to fifth days of the puerperium.

Discussion of Aetiological Factors

The aetiological factors in such a case as this must remain a matter for conjecture. A soft thin-walled lower uterine segment, laxity of the supporting ligaments and abdominal wall, in combination with excessive movements of the foetus, uterine obliquity, or the presence of an asymmetrical uterine fibroid, could conceivably induce such a condition. Moreover, if in the same circumstances the mother habitually lay on her right side some degree of clockwise axial rotation could possibly occur. If any such factors, however, were alone sufficient the condition would obviously occur more often. An analogy with the torsion of a large ovarian cyst does not cast much light on the matter; for morphological considerations, such as the presence of supporting ligaments and the width of the pedicle relative to the size of the tumour, make the two conditions hardly comparable.

Differential Diagnosis

In differential diagnosis the main possibilities receiving consideration were as follows:

Concealed accidental haemorrhage was suggested by the presence of uterine pain and tenderness in association with some nausea and vomiting at the onset. It was negatived, however, by the absence of any signs of hypertension, albuminuria, oedema, or other evidence of toxaemia. Furthermore, the uterine tenderness was never localized, and the subsequent course of events had little in common with the clinical picture of a concealed intra-uterine haemorrhage.

The points in favour of a diagnosis of *tonic contraction* were limited to the presence of progressive uterine pain and tenderness. Against such a possibility are clearly the facts that at no stage was the patient obviously in labour, there was no evidence of malpresentation, no fixation of the presenting part, and no retraction ring, and the progress of events was entirely different.

The changes occurring in a *necrobiotic fibromyomatous tumour* are well known as a source of acute abdominal pain during pregnancy—a pain often associated with nausea and vomiting. But the pain, and certainly the tenderness, remain localized in such a condition; the tumour may or may not be palpable, and the onset of the pain is usually more sudden than in this case.

Acute hydramnion was also considered, for the rapid accumulation of an excessive quantity of liquor amnii, though comparatively rare, leads to much abdominal discomfort if not actual pain—nausea is often present, and the outline of the uterus may stand out markedly. Nevertheless, other evidence in this case was not consistent with a diagnosis of acute hydramnion.

The masking of the classical symptoms and signs of *acute appendicitis* in late pregnancy is well known, and this possibility had to be considered. It was excluded on the localization of the tenderness to the uterus itself, the absence of any toxic features about the case, and the general impression that the source of the trouble was uterine rather than extra-uterine.

Discussion of Treatment

Treatment of this case was essentially expectant in the first instance. The artificial rupture of the membranes

made the subsequent Caesarean section somewhat more hazardous, but the eventration and packing off of the intact organ reduced the risks of peritoneal soiling.

In view of the fact that the case was suspect, and bearing in mind the difficulties of the lower segment operation under the circumstances, would it have been permissible simply to correct the torsion, establish the viability of all parts of the uterine wall, close the abdomen, and bring the patient into labour by means of a medical induction? However, there being no guarantee that the torsion would not recur, such a procedure would surely have been unjustifiable in this case.

My acknowledgments are due to Dr. K. Wilson, obstetrician to the Brisbane Women's Hospital, for permission to publish this case, and to Dr. Bogle of Beaudesert for supplying the details of the initial stages of the condition.

Clinical Memoranda

Absorption of Iron

As noted in an editorial on Kaschin-Beck's disease in the *British Medical Journal* of March 23, 1940 (p. 490), Hiyeda (1939) found surprisingly large amounts of iron in the blood of patients living in the endemic area. He attributed this to the fact that the water of the wells was contaminated with iron, and to confirm this supposition he made experiments on men and animals in which inorganic iron was administered continuously. He reported that the blood iron rose gradually, reaching a point almost two or three times the normal—for example, 123 mg. per 100 c.cm.—after about a fortnight and later decreasing again. These results are strongly opposed to orthodox teaching, according to which iron is absorbed in the serum, in minute quantities only detectable by the most refined technique (Starkenstein, 1934), and the red cells are impermeable to iron (Schultze, 1940). On reading Hiyeda's paper some weeks ago we therefore carried out the following experiment:

Blood iron was estimated in a normal subject on a mixed diet before and after the administration of a massive dose of iron, and also at intervals of a few days during a twenty-eight-day period in which 900 mg. of citrated ferrous chloride was being taken daily. The titanous chloride titration of Klumpp (1934) was employed, and duplicate estimations were made, agreeing in all cases within 0.5 mg. per 100 c.cm. of blood. To exclude gross changes in the haemoglobin level Haldane's method was used.

The iron content of the blood was determined on three occasions before any iron was given, and found to be 58.3, 57.8, and 56 mg. per 100 c.cm. On the first day of the experiment a dose of 1,500 mg. of citrated ferrous subchloride, containing 0.5 gramme of iron, was taken, together with the juice of an orange. For the rest of the experimental period 0.1 gramme of iron was taken thrice daily in milk. The results are shown in the table.

Day of Experiment	Blood Iron mg. per 100 c.cm.	Haemoglobin per cent. Haldane
1 — 9.15 a.m.	56.0	112
1 — 9.30 a.m.	0.5 gm. of iron by mouth	
1 — 10.30 a.m.	54.9	112
1 — 12.30 p.m.	55.1	112
1 — 2.30 p.m.	54.7	114
1 — 5.30 p.m.	54.1	112
2	55.2	114
4	56.0	112
10	55.2	—
14	59.9	104
21	58.8	112
28	60.0	112

It will be seen that although the blood iron fluctuated through a range of 6 mg. per 100 c.cm. before and during the experimental period, there was no suggestion of the gross increase in blood iron observed by Hiyeda. He gives no account either of the method which he used in estimating iron or of the conditions under which his experiment was carried out. In these circumstances it is not possible to suggest any explanation for the complete discrepancy between his results and ours; it must, however, be pointed out that our findings are in accord with accepted views on iron absorption and transportation.

Summary

In an experiment designed to test Hiyeda's observation of a two- or three-fold increase in blood iron as a result of iron administration it was found that no significant alteration in blood iron occurred either after a single massive dose or in the course of continued administration of iron.

D. A. K. BLACK, M.B., M.R.C.P.
JOAN POWELL, B.A.
L. J. WITTS, M.D., F.R.C.P.
The Radcliffe Infirmary, Oxford.

REFERENCES
Hiyeda, K. (1939). *Jap. J. med. Sci.*, V Path., **4**, 91.
Klumpp, T. G. (1934). *J. biol. Chem.*, **107**, 213.
Schultze, M. O. (1940). *Physiol. Rev.*, **20**, 37.
Starkenstein, E. (1934). *Handbuch exp. Pharmakologie*, **3**, 908. A. Heffter and W. Heubner.

Staphylococcal Meningitis Treated with Sulphapyridine: Recovery

The following case is of interest in that, although the sulphonamides are generally considered to be without effect in staphylococcal infections, recovery ensued with marked rapidity in a condition which is usually of great severity and carries a high mortality rate.

CASE REPORT

A soldier aged 20, who had never had any serious illnesses in the past, was admitted to the Slough Emergency Hospital on March 30, 1940, with the history of a sore throat a fortnight previously and sudden illness the day before admission, with malaise, headache, sweating, and pains in the knees, thighs, neck, shoulders, and right wrist. On examination he was sweating profusely, but was afebrile; the pulse rate was normal and no abnormal physical signs could be elicited. It was thought that the condition might be rheumatic; but there was no improvement with salicylates, and the blood sedimentation rate and white count were both normal. The next day his temperature rose rapidly to 102° F. without a coincident rise in the pulse rate, and his headache became much worse and was followed by a generalized convulsion. Lumbar puncture revealed that the cerebrospinal fluid was turbid, and while awaiting the bacteriological report sulphapyridine was given, being continued four-hourly (initial dose 2 grammes, followed by 1 gramme, to a total of 25 grammes). Within a few hours the examination of the cerebrospinal fluid showed 1,070 polymorphonuclear leucocytes per c.mm., with a prolific growth of staphylococci. As it was clear from the temperature chart and the patient's general condition that he was rapidly improving it was decided to continue with the sulphapyridine. In two days the headache and other symptoms had entirely gone, and within five days the cerebrospinal fluid had returned to normal in all respects.

Although there is, of course, no proof that recovery in this case was in any way associated with the use of sulphapyridine, yet the dramatic result suggests that this was not an instance of *post hoc, ergo propter hoc.*

A. MORTON GILL, M.D., M.R.C.P.,
Physician and Medical Officer in Charge,
Slough Emergency Hospital.

Reviews

GENERAL THERAPEUTICS IN 1939

The 1939 Year Book of General Therapeutics. Edited by Bernard Fantus, M.S., M.D., and Leroy Hendrick Sloan, S.B., M.D., F.A.C.P. (Pp. 532. $2.50 or 12s. 6d.) Chicago: The Year Book Publishers; London: H. K. Lewis and Co.

The *Year Book of General Therapeutics* is always a useful handbook, and the volume for 1939 is no exception to the rule. The abstracts are clear and concise, and the discussions lay stress on the practical aspects of the matter in hand. The editors select the following as the most interesting therapeutic advances of the year: methods of storing blood for transfusion; new methods of oxygen administration; the recognition of subclinical states of vitamin lack; the medical treatment of urinary calculi; endocrine treatment by gonadotrophic substances in childhood, by testosterone and by desoxycorticosterone acetate; shock treatment in mental states; the use of dilantin in epilepsy and Bulgarian belladonna in Parkinsonian states; the use of potassium chloride in allergy; the need for recognizing the importance of bromide intoxication; and the use of thiocyanates in hypertensive states. We may comment on a few of these.

Recent work suggests that chemical solution and vitamin control (we would particularly specify vitamin A in this connexion, which this book does not) are already accomplished facts for some types of stone. Despite certain hazards convulsive shock therapy by metrazol, insulin, or picrotoxin is undoubtedly gaining ground and is justified by results, but it is somewhat alarming to learn of the relatively frequent occurrence of vertebral fractures produced by the violence of the convulsions. No mention, however, is made of electrically produced convulsions, for which it is claimed that such fractures result much less frequently, while the patient suffers none of the highly unpleasant side-effects of the drug methods, but on the contrary has complete amnesia of the whole affair. Dilantin (epanutin) may have a toxic effect on some patients, particularly if given before food. The patient, instead of having daily fits, may go for eight to ten days without any, but then may have several in close succession. It may lead to amelioration in some cases in which other drugs have been ineffective. Bulgarian belladonna is here spoken of in much more favourable terms than has been usual of late years, so that it is perhaps worth a renewed trial in this country despite previous disappointments. The displacement of sodium ions by potassium ions seems to produce a local dehydration of swollen tissues, which may account for the relief potassium chloride sometimes affords in allergic rhinitis. It should be given in aqueous solution, and is contraindicated in patients with renal disease or any suspicion of adrenal insufficiency. The protest against over-drugging with bromide is timely. When it has been given to the point of inducing mild mental confusion there is a tendency to press it or at any rate to continue it; whereas it should be stopped, for if the bromide content of the blood exceeds 250 mg. a definite toxic psychosis will result. Attention is called to the risks of thiocyanate administration without blood cyanate determinations. We may add that since William Evans has reported its comparative ineffectiveness in hypertension in a series of carefully controlled observations its use may well be abandoned.

CALMETTE

Albert Calmette: Sa Vie, son Œuvre Scientifique. By P. Noël Bernard and Léopold Nègre. With a preface by Pasteur Vallery-Radot, foreword by A. Yersin. (Pp. 272. $1.15.) Paris: Masson et Cie. 1939.

In a style resembling Vallery-Radot's rather than Duclaux's life of Pasteur, two of his most intimate associates set out to describe the life and scientific work of Calmette. To most medical men the name of Calmette is associated with tuberculosis, and especially with B.C.G. vaccine. His earlier work on venins and antivenins is known mainly to immunologists. In both fields Calmette left his mark. Whether in research or in administration, of which he had his full share, Calmette was an organizer who not only planned and directed his work, but by his understanding of human nature succeeded in endearing himself to the numerous colleagues and students whom he collected around him. To a wide group of admirers throughout the world his death in 1933 came as a shock. Along with that of Emile Roux five days later, it deprived France of two of its greatest Pasteurians.

Calmette was born of landed gentlefolk at Nice in 1863. His early ambition was to enter the Navy. In the capacity of unqualified assistant medical officer he sailed in 1883 for the China Seas to join the squadron of the Far East. He returned two years later, took his doctor's degree in 1886, and then set out for West Africa and the Congo, where he learnt something of the obstacles to successful colonization presented by tropical disease and lack of hygiene. Coming back to France again, he married in 1888, and left almost at once for the islands of Saint-Pierre and Miquelon, just south of Newfoundland. Here, though acting virtually as chief medical officer, he became interested in bacteriology, and traced the red coloration of dead cod to the activities of a chromogenic coccus. Returning in 1890, he took a course at the Pasteur Institute, and produced such a favourable impression on Roux that he was deputed the same year to open the first Pasteur Institute beyond the seas at Saigon in Cochin China. It was this that provided him with an opportunity to study cobra venom. From 1891 to 1893, and then at intervals for the next twenty years, Calmette published a long series of papers on the properties of the venins, and of the antivenins which he had succeeded in preparing. In 1893 he was recalled to Paris, and two years later he left for Lille to open a new Pasteur Institute in the heart of a large industrial population. There he stayed till 1919, enduring the rigours of the German occupation during the great war.

The last period of his life, 1919–33, was spent at the Pasteur Institute in Paris, where he had the satisfaction of continuing the work on tuberculosis which he had begun about 1900, of discovering the prophylactic power of the B.C.G. strain of attenuated tubercle bacilli, and of seeing the completion in the grounds of the institute of a large new building devoted to the study of tuberculosis and to the preparation of such products as tuberculin, B.C.G. vaccine, and the methylic antigen of Boquet and Nègre. Deafness and the Lübeck disaster embittered his closing years, but to the very end he remained an indefatigable worker, stimulating and directing the efforts of his research students.

Not all of Calmette's work was of equal merit. His work on venins and antivenins has stood the test of time. In tuberculosis few would now be prepared to accept his conclusions on the importance of the intestinal route of infection in human pulmonary tuberculosis, nor on the

filterable stage in the life cycle of the tubercle bacillus and its production of hereditary tuberculosis by placental transmigration. On the practical value of B.C.G. it is as yet too early to pronounce a final judgment; but that his main conception of acquired immunity in tuberculosis as resulting from the presence in the body of living tubercle bacilli was essentially correct there seems no reason to doubt.

The present volume contains a history of his life, a summary of his work, and a list of his publications; and it pays a tribute in no uncertain terms to one of the masters of French bacteriology.

CELLS AND PROTEINS IN THE CEREBRO-SPINAL FLUID

The Content of Cells and Proteins in the Normal Cerebrospinal Fluid. The Diagnostic Importance of Demonstrating Small Pathological Changes in the Cells and Proteins. The Technique of the Investigation. By Axel V. Neel, M.D. (Pp. 142. 7s. 6d. net.) Copenhagen: Einar Munksgaard; London: Oxford University Press. 1939.

The recognition of pathological changes in the cell and protein content of the cerebrospinal fluid is of such importance as to justify the author of this monograph in considering in great detail a relatively small field of clinical pathology. The main aim of the work is to establish the normal number of cells and the normal quantity of proteins in the cerebrospinal fluid as well as the clinical significance of small changes above these normal values. A detailed review of the literature reveals considerable variation in the recognized normal cell content. An analysis of this literature, however, in reference to the type of patient chosen as normal leaves the author satisfied that his own finding of a normal cell count of 0 to 1/3 cell per c.mm. is reliable. The author's own researches carried out over many years justify this conclusion, although he is far from maintaining that a figure of more than 1/3 cell per c.mm. necessitates the diagnosis of an organic disease of the central nervous system. The general clinical significance of very slight changes is, however, inadequately discussed. Slight changes above normal were found in such surgical conditions as haemorrhoids and appendicitis.

With regard to the protein content, Dr. Axel Neel agrees with the normal value found in the literature—namely, 13 to 26 mg. per 100 c.cm. The different methods of carrying out the protein estimations are discussed. The author's view that the estimation of the globulin fraction dispenses in most cases with the necessity for colloidal tests may not be generally accepted.

The subject-matter of the work could have been made much more easily read by the use of headings throughout the chapters. Nevertheless it will be found useful by workers in this field.

SURGICAL PATHOLOGY OF THE MOUTH AND JAWS

Surgical Pathology of the Diseases of the Mouth and Jaws. By Arthur E. Hertzler, M.D. (Pp. 248; 206 figures. 21s. net.) London: J. B. Lippincott. 1939.

This is the tenth monograph on surgical pathology from the pen of Dr. Arthur Hertzler and completes a series: it is a tribute to the industry and careful work of the author, who describes himself as a country doctor. The observations are his own made from cases which he has actually seen—he tells us that he has always found it impossible to write of things he has not seen—and some idea of the high standard which Dr. Hertzler has followed throughout his work may be gathered from his statement that he has always held that one has no right to quote literature which he has not read in the original. He frankly states that he has not read the papers cited and therefore accepts no responsibility for them if they are not good!

The present monograph consists of twelve chapters clearly written in the attractive style which one has come to associate with all Dr. Hertzler's writings (*The Horse and Buggy Doctor*, etc.) and illustrated with excellent photographs of actual cases of pathological specimens and of their microscopical appearances. In parts the style is almost racy, as when we are told that since leucoplakia occurs chiefly in men "it must be due to some moral dereliction, but unfortunately for this theory it does not spare the nice men. Certainly it is not due to syphilis nor to smoking"; and referring to chancre of the lip we read that the lesion is so obvious that it will not be overlooked if one thinks of its possibility, even in Kansas! Throughout the book the arrangement adopted is a general description of the particular lesion under consideration; then follow accounts of its pathogenesis, pathology, and histology. The point of view is essentially a practical one—that of the operating surgeon rather than the academic pathologist. It is not perhaps surprising, therefore, to find tumours of dentigerous origin for which an alternative title of "mixed tumours" is suggested, considered under four headings as dentigerous cysts, root cysts, odontomes, and adamantinomas—an arrangement which may not be readily acceptable to many but which from the practical aspect has its advantages. The book deals with diseases of the larynx as well as affections of the mouth, tongue, jaws, teeth, palate, and lips.

Most surgeons will want to possess the Hertzler monographs because they contain the experiences of a life's work carefully recorded in a form which not only makes attractive reading but is so direct and to the point as to be immediately helpful to the seeker for information.

BRAIN AND BODY OF FISH

Brain and Body of Fish. A Study of Brain Pattern in Relation to Hunting and Feeding in Fish. By H. Muir Evans, M.D., F.R.C.S. (Pp. 164. 15s. net.) London: The Technical Press, Ltd. 1940.

Academic scientists who make their subject their profession must always entertain a deep admiration for those "laymen" who, in the midst of a busy life, yet find time to prosecute valuable scientific work. Such outstanding manifestations of the real spirit of scientific inquiry are still occasionally to be seen, in spite of the increasing complexity of modern technical methods, and Dr. Muir Evans is one example. His book *Brain and Body of Fish* is the outcome of many years of observation and study completed during the few spare hours which may be available to the medical practitioner. The book is in no way intended to be a systematic treatise, either of the brain or of the body of fishes. Rather is it a collection of essays dealing mainly with the relation of major variations in the external configuration of the brain of fishes to their habits and mode of feeding.

It is well known that in primitive vertebrates in which the lower functional centres of the nervous system are not obscured by the development of large and complicated suprasegmental mechanisms interspecific variations in the proportions of different parts of the brain are to be found. Dr. Muir Evans has made excellent use of this phenomenon in interpreting these variations by reference to his

intimate knowledge of what may be termed the "natural history" of fishes. The two introductory chapters give a straightforward and elementary account of the component parts of the brain, readily intelligible to the ordinary reader. Later chapters deal in some detail with the several sensory functions of the brain, such as gustation, hearing, and cerebellar functions, while other sections describe the cerebral variations in different groups of fishes as a whole. There can be no doubt that the author's method of studying the correlation of function and structure is profitable from the anatomical point of view, for it does provide valuable clues to the significance of neural mechanisms which might otherwise be quite obscure. The book is written in a highly attractive style and is abundantly illustrated with informative "thumb-nail" sketches. It is a book which not only will be useful to the comparative neurologist but must also be read by all those who make a study of fishes, whether from the strictly biological point of view or from the point of view of the fisherman who finds it desirable to be acquainted with the habits of the various species of fish in which he has a sporting interest.

We think the addition of an index and a list of references would improve this book considerably, and it seems also that the author has tended (in the preface) to underestimate the immense amount of detailed anatomical work which has been previously completed on the structure of the fish brain by such anatomists as Edinger, van Gehuchten, Tretjakoff, Kappers, Herrick, Wallenberg, Johnston, Burckhardt, Holmgren, and Tello. Nevertheless, the whole book reflects a simplicity of approach to the study of the fish brain which is very welcome and satisfying.

Notes on Books

Manual of Fractures, Dislocations, and Epiphyseal Separations, by HARRY C. W. S. DE BRUN, M.D., F.A.C.S. (Chicago: The Year Book Publishers; London: H. K. Lewis and Co.; 17s. 6d.), is a short handbook covering most of the modern methods employed in the treatment of fractures, and should be of service to anyone working in a fracture clinic. All the common fractures are discussed and many details of practical value are described. We might particularly mention the method employed for photographically recording angular movements and their limitations. The book is amply illustrated with photographs of cases and with excellent sketches which show very clearly details of treatment. It is essentially of a practical nature and very little attention is devoted to pathological or diagnostic detail, while the descriptions of the more elaborate operative procedures, such as those for fractures of the neck of the femur, are scarcely sufficient for the operating surgeon. To a student working in a fracture clinic with experienced surgeons the book, however, would be of great value.

The fourth edition of Mr. A. P. BERTWISTLE'S *Descriptive Atlas of Radiographs* has been revised and enlarged, and now contains 852 illustrations, each with a descriptive legend. Some of these illustrations are retained from the original edition published in 1926. Some others are new and are of excellent quality. The list of those who have contributed illustrations includes many distinguished names, and a number of cases of interest and rarity will attract the attention of the reader. The descriptive matter contains many heterodox views. Few will agree, for instance, with the view expressed on page 451 that in a radiograph of a normal chest "the markings of the bronchial tree are beautifully seen; the older view that the markings are due to blood vessels can be definitely discountenanced." In compiling this volume it is the design of the author to provide an atlas for the use of the clinician who desires to know what *x* rays are capable of showing. Some such will find it of use and interest. The publisher is H. Kimpton and the price 42s.

The series of précis published by Masson are well known, and a second edition is now issued of oto-rhino-laryngology by Dr. GEORGES LAURENS, with whom Maurice Aubry and André Lemariey are associated (*Précis d'Oto-Rhino-Laryngologie*. Paris: Masson et Cie; $3.90). This book, which is of moderate bulk and easy to handle although it runs to twelve hundred pages, contains a most complete account of the subject written in a style so easy and flowing and devoid of all verbiage that it can be read with the greatest pleasure. The wisdom and experience of Dr. Laurens constantly appear, and it is evident that although the book after an interval of nine years has been carefully brought up to date, yet nothing dubious or not fully tested has been considered worthy of inclusion. Sections which are especially to be noted are those on the ear, including audiometry, and those dealing with the manifestations of suppuration in the temporal bone. The whole book, however, is a marvel of clarity and cannot be too enthusiastically recommended.

In our review of the first edition of *A Textbook of Surgery*, by American authors, edited by FREDERICK CHRISTOPHER, published in 1936, we stated that this was certainly one of the best of recent surgical textbooks. This opinion is confirmed by the second edition; some matter has been deleted, but there are important additions to many of the sections. Twelve different authors now discuss the various uses of sulphanilamide, which had not appeared in the former edition, and the work has generally been revised. Few textbooks can compare with this as an up-to-date account of all that is best in modern surgery. It is published by W. B. Saunders at 42s.

Sex Problems in Wartime, by Dr. G. L. RUSSELL, is a small handbook published by the Student Christian Movement Press, at 1s., intended primarily for workers and for all concerned with the welfare of men and women in the Forces. It is in the main a clear statement of the Christian attitude towards the increased sexual strains of war conditions. The chapters dealing with homosexuality and masturbation are particularly well written and deserve the attention of all concerned with the guidance of young people.

Preparations and Appliances

NARCONUMAL

"Narconumal" (Roche Products, Ltd.) is the sodium salt of a short-acting barbiturate which has the composition 1-methyl-5:5-allyl-isopropyl barbituric acid. The drug is recommended for intravenous injection for the production either of basal narcosis or of full surgical anaesthesia. The manufacturers claim that narconumal is one of the most powerful and yet one of the safest of the intravenous anaesthetics.

Narconumal has been in clinical use for some years. The bibliography provided shows references beginning in 1934. The manufacturers state that it has been used as an intravenous anaesthetic in more than 6,000 operations.

INTENSIVE VITAMIN THERAPY

Concentrated radiostoleum for injection (British Drug Houses, Ltd.) contains 75,000 international units of vitamin A and 15,000 international units of vitamin D per gramme. It is intended for use in infections where intensive vitamin therapy is indicated.

HEXANASTAB

Hexanastab and hexanastab-oral (Boots Pure Drug Co.) are preparations of the well-known short-acting barbiturate N-methyl-C:C-cyclohexanyl methyl barbituric acid.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY MAY 18 1940

TRANSFUSIONS OF PLASMA

The expectation of large numbers of air-raid and military casualties has given a great stimulus to the study of transfusion of blood and of possible substitutes. Stored whole blood as opposed to fresh blood has definitely proved its worth in Russia, Spain, and, more recently, in England and the U.S.A. The use of serum or plasma is now receiving serious consideration. In many cases in which transfusion is given it is probably the fluid elements that produce the desired effect, while the red cells are of only secondary importance: the plasma proteins are, on theoretical grounds, probably the effective factors in the treatment of shock from wounds and burns and after operation. The mechanism of shock in such conditions is not clearly understood. It is not necessarily the same in each, but in all there is a loss of fluid to the tissues from the circulating blood, resulting in a fall of blood pressure. It is essential in treatment not only to replace the circulating fluid but, if possible, to withdraw it from the tissue spaces. This can be done by infusing fluid with a high colloid pressure, and in the past gum acacia has been used for this purpose, but gum acacia has certain disadvantages. The normal plasma proteins should theoretically be capable of exerting the same colloid pressure without any injurious effects. H. M. Trusler, H. L. Egbert, and H. S. Williams,[1] in an elaborate clinical and biochemical study of a series of cases of serious burns treated with whole blood or plasma transfusion, have shown that plasma may play an important therapeutic part in shock from burns. Transfusions of plasma in their patients resulted in withdrawal of fluids from the waterlogged tissues into the circulation. In the *Journal* of March 9 F. R. Edwards, J. Kay, and T. B. Davie[2] described the satisfactory use of plasma in cases of wound shock and post-operative shock, and confirmed the admirable effect of this treatment in shock from burns. A report from J. Elliott and his co-workers[3] in the U.S.A. substantiates the claims made for plasma infusion in the case of wound shock. The value of plasma in certain cases would therefore appear to be established. On theoretical grounds, again, serum might be thought to have greater advantages than plasma, since it is not diluted in any way with anti-coagulant solutions. At the moment there is less clinical evidence as to the value of serum. Remarkable improvement has been described by Aldrich and his co-workers[4] in cases of nephrosis treated with highly concentrated serum prepared by the method of Flosdorf and Mudd,[5] while experimental work on animals by D. D. Bond and D. G. Wright[6] and by E. G. Mahoney[7] suggests that such serum would be of definite value in the treatment of shock after haemorrhage, trauma, and burns.

From the practical point of view both plasma and serum have several advantages. They can both be dried and kept as a powder for an indefinite period at any temperature. When needed they are reconstituted by the addition of sterile distilled water or glucose solution. Whole blood must be kept at a steady low temperature which entails elaborate refrigeration, and even then is not of great therapeutic value, apart from its plasma, after a month's storage. Owing to the increasing fragility of red cells on storage the transport of whole blood also presents difficulties, whereas the transport of dried serum and plasma is quite easy. Further, any bank of whole blood is bound to involve some wastage. If, therefore, the plasma of out-of-date blood can be saved and used considerable economy will be effected. Available evidence also suggests that plasma can be given without any regard to its blood group, since the agglutinin content of the infused plasma is so rapidly diluted as to be unimportant. On theoretical grounds Group AB plasma is ideal, since it contains no agglutinins, but Group AB individuals represent too small a proportion of the population for this to be taken into practical consideration. Edwards, Kay, and Davie have tried the ingenious experiment of storing Group A (II) blood in the same bottle with Group B (III) blood, so preparing an artificial AB plasma. Since the proportion of Group B individuals in the population is so much smaller than that of Group A individuals such a scheme is also hardly practicable. If grouping is unnecessary in the case of plasma and serum it will enormously increase the list of potential donors for emergency use. The method of preparation of both whole and dried plasma described by Edwards and his colleagues has the great merit of simplicity—an important point in war conditions. That of Elliott and his co-workers, which involves the use of a large centrifuge, though admirable in its results, is expensive, and both cleaning and replacement of spare parts must present difficulties.

Although much still remains to be learnt about the use of plasma, and more particularly of serum, in transfusion, it is probable that the blood bank of the future will contain a supply of blood, serum, and plasma. It remains to find a use for the discarded red cells.

CHEMICAL COMPOSITION OF DIETS

The dietary treatment of disease, whether by way of prevention or cure, can run a swift and successful course only if harnessed to the twin horses of physiology and analytical chemistry. Knowledge of deficiency diseases, and of the "conditioned deficiencies," is now so extensive that it is unlikely to grow further

[1] *J. Amer. med. Ass.*, 1939, **113**, 2207.
[2] *British Medical Journal*, 1940, **1**, 377. See also ibid., 1939, **2**, 957.
[3] Report from the Department of Pathology, Rowan Memorial Hospital, Salisbury, N.C.
[4] *J. Amer. med. Ass.*, 1938, **111**, 129.
[5] *J. Immunol.*, 1935, **29**, 389.
[6] *Ann. Surg.*, 1938, **107**, 500.
[7] Ibid., 1938, **108**, 178.

at more than a comparatively slow pace. It is perhaps questionable whether we are to-day as well informed about the dietary treatment of those illnesses not directly due to faults of feeding. Whatever advances are made in this matter, however, by the co-operative investigations of clinicians, pathologists, physiologists, and biochemists, the knowledge gained will only be successfully applicable, like the knowledge of deficiency diseases already available, if accurate information is to hand about the composition of the foods to be prescribed or prohibited.

For some time past—probably for decades—physicians have always been compelled to accept for the composition of foods figures that are partly traditional and partly inaccurate, and it has been very difficult, if not impossible, to know exactly which of these figures are trustworthy enough for any specific purpose. There is at least one well-known textbook concerned with dietary treatment that still includes food analyses carried out in the middle of the last century. Quite apart from the complications introduced to-day by the need for knowing the contents of vitamins and trace metals in the great variety of foodstuffs available to mankind, it would seem that a drastic overhaul of the data about the gross constituents of foods has long been overdue. To this revision Dr. McCance and his colleagues have for some time been contributing, some of their results being published in scientific journals and a considerable number being collected in two publications issued by the Medical Research Council in its Special Report Series (No. 187, 1933, and No. 213, 1938). We now have before us a third report in this series,[1] in which Dr. McCance and Miss Widdowson have gathered together in a new form all their earlier results, many of them revised and corrected, along with a large number more that have hitherto not been published at all. The report without doubt gives the most accurate figures available to-day for the composition of foods, both flesh (meat, poultry, game, and fish) and plant (cereals, fruits, and vegetables); it enables the medical practitioner immediately to look up the average protein, fat, and carbohydrate contents of these foods, in the condition in which they are likely to be consumed. That is to say, where the food is normally eaten cooked the authors supply figures for the composition of the cooked food as eaten, and make these figures even more valuable by giving the percentage of edible material in the cooked food. Further, for the same foods he will find the contents of individual metallic and non-metallic elements—that is, for sodium, potassium, calcium, magnesium, iron, copper, phosphorus, sulphur, and chlorine. Besides those foods already mentioned the tables give figures for dairy produce, beverages, condiments, preserves, and sweetmeats, and for a number of cakes, pastries, and puddings which have been made to standard recipes, all of them given in ten special pages of this report. Beyond its many other admirable properties it functions, therefore, also as a kind of "micro-Beeton."

[1] *The Chemical Composition of Foods.* By R. A. McCance and E. M. Widdowson. Med. Res. Cncl. Sp. Rep. Ser. No. 235. (Pp. 150. Price 4s., postage extra.) H. M. Stationery Office, 1940.

For the flesh foods the authors have made separate determinations of protein and purine nitrogen. Study of these figures leads to the rather sardonic reflection that the presence in chicken flesh of about the same amount of purine nitrogen as in beef-steak would hardly seem to justify the substitution of the first for the second in the diet of those whose uric acid output the physician is attempting to control. Such physicians may also be reminded that sweetbreads contain over five times as much purine nitrogen as beef, and that mutton chops are much to be preferred to guinea-fowl, as are also tripe, eel, and shrimps! Tabular matter does not as a rule make light bedside reading, but it is possible to browse in this report and find many stray pieces of information that set speculation in train. How is it, for example, that a certain much-advertised bran food contains nearly three times as much magnesium as any other food? Does it derive in part from salts used in manufacture, or is it natural to bran? Figures in the literature indicate, in fact, that magnesium in bran may be almost as high again as that found by the authors of this book, and that bran is probably a good deal richer in magnesium—presumably as phytin—than even wheat-germ. What is the significance to the wheat berry of this high magnesium concentration in germ and bran? Such questions are of value, too, in counteracting the perhaps somewhat too anthropocentric outlook of those concerned primarily with human nutrition; it is good to become for a while phytocentric, provided it does not lead altogether to eccentricity. Dr. McCance and Miss Widdowson have not shirked a further responsibility of those who wish to give us useful information about the composition of our diets. For certain important foods they give figures for the available phosphorus—that is, the phosphorus not present as phytic acid or its salts—expressed as a percentage of the total phosphorus, and they do the same for the available iron—that is, the ionizable iron that can be estimated by means of $\alpha:\acute{\alpha}$-dipyridyl.

Anyone with direct experience in the analysis of food will feel very humble when confronted with these tables. He will know that the tabulated figures—all, be it repeated, from the bench of Dr. McCance and his colleagues—represent a summation and integration of laboratory routine at the extent of which the chemist's mind almost boggles. Day after day, week after week, month after month, a steady and inexorable stream of samples must have been passing in apparently never-ending succession through the mechanism of the analyst's workshop—mincer and spatula, beaker and flask, balance and burette—towards the completion of these tables: out of the ashes and vapours of crucible and fume-cupboard has arisen this phoenix of quantitative knowledge. All this information is included in 116 pages of tables. These, with five pages of general introductory matter, a list of references, an adequate index, and the recipes already mentioned, together constitute what must remain for many years the most authoritative and trustworthy collection of food analyses available. It will be found indispensable to many scientists outside the medical profession; within the medical profession

no practitioner will henceforward be justified in giving advice on dietary matters, whether such advice is designed to increase or to diminish a patient's diet in respect of particular food constituents, unless he has a copy of this report—not in his upper bookshelves but on the desk of his consulting-room.

ESTIMATIONS OF VITAMINS IN MARGARINE

Margarine is now compulsorily vitaminized with vitamins A and D. The estimation of these in margarine is constantly engaging research chemists, and two papers on the subject were recently read before the Society of Public Analysts and Other Analytical Chemists. The estimation of vitamin A depends upon spectrometric tests of a highly technical character, but for vitamin D the spectrometric and chemical methods are not suitable, and recourse is made to a biological method. Hitherto what is known as the "line" test has been employed, a test based on the measurement of calcification in the bones of the young rat. In the newly weaned rat the shaft of the bone of the extremities is separated from the cap by a width of cartilage, and calcification normally takes place as the animal grows older. If, before calcification is complete, the rat is fed on a deficiency diet, the process ceases. One animal of a pair which have been deprived of vitamin D is then made to receive a certain prescribed amount of the vitamin per day as the International Standard, the other receiving a sample of margarine thought to contain about an equivalent amount of the vitamin. At the end of ten days both animals are killed, the leg bones dissected out, hardened in formalin, and stained with silver nitrate, and the new lines of calcification in the animals is precisely measured and comparison is made. This method has proved satisfactory for margarines having a potency of about one international unit per gramme. With lower-potency margarine, however—say those of 0.1 unit per gramme—or winter butter the results from these assays are liable to be falsified by the effect of the fat. To assay low-potency margarine the more sensitive bone-ash method has been adopted, and this was described in some work from the Unilever Research Laboratories by Dr. H. Wilkinson and two collaborators at the meeting of the society above mentioned. The bone-ash test, unlike the "line" test, is a prophylactic method. Newly weaned rats are again taken in pairs, one of each pair being given vitamin D daily according to the dose of Standard and the other the test substance. At the end of three weeks the rats are killed and the bone-ash content of the dried hind-leg bones computed. The bone-ash percentage in the newly weaned rat may be roughly 45, and may fall to 20 after three weeks' deprivation of vitamin D. This test has been found to work perfectly well with dosages of one-sixteenth of an international unit of vitamin D per day. One curious result on comparing the "line" test with the bone-ash test is that in every case the value elicited (expressed as the ratio of the potency of the substance tested to the potency of the international standard) is lower than that obtained by the "line" test. The "line" test measures a purely localized reaction, whereas the bone-ash test, which is much more sensitive, measures a generalized reaction. Dr. Wilkinson and his co-workers have lately transformed the bone-ash test from a prophylactic to a curative test, and again the same quality of results has emerged. In the same rats, after the prescribed period, the front legs have been dissected out for the "line" test and the hind legs ashed for the bone-ash test, and again the values are consistently lower for the latter test than for the former. It emerges from this work that ordinary margarine of a potency of about one unit per gramme can be assayed quite satisfactorily by the "line" test, but that materials of lower potency are probably best assayed by the bone-ash method, in which case values lower than those obtained by the first method must be expected.

PYRUVIC ACID IN VITAMIN B_1 DEFICIENCY

The normal amount of pyruvate in human blood is about 0.5 mg. per 100 grammes.[1] During exercise this amount increases considerably, and the higher level may be maintained or even increased still further at the end of half an hour's rest after the exercise.[2] If, however, vitamin B_1 is injected intravenously before the exercise is taken, light exercise may or may not be followed by an immediate increase in blood pyruvate. Heavy work may bring about a large increase in blood pyruvate, accompanied by clinical manifestations resembling those of fulminating beriberi, but still heavier work may be unaccompanied by these symptoms if the subject is adequately supplied with vitamin B_1. The blood pyruvate of vitamin-B_1-deficient subjects can be raised by exercise to the level found in patients with fulminating beriberi. Similar high values have been observed in normal subjects exercised to exhaustion. Initial values may be restored in normal subjects by resting for less than an hour. In vitamin-B_1-deficient subjects recovery after exercise is delayed. Thus vitamin B_1 seems either to prevent the formation of the excess pyruvate or to help in its dispersal. It has been suggested that the amount of pyruvate in the blood before and after exercise and again after half an hour's rest would afford a means of detecting latent vitamin B_1 deficiency. The fate of the pyruvic acid of the blood has also been investigated.[2,3] It is excreted in increased amounts in the urine after exercise, but when pyruvate is injected into the blood stream it does not pass wholly into the urine. Some of it is apparently changed into a non-glucose-reducing substance and lactate, which afterwards give rise to glucose. About 2 to 3 per cent. of it is found in the muscles eight minutes after injection, and there is little or no change then in muscle lactate or glucose. It is almost certainly concerned with the regeneration of carbohydrates, but in what way is by no means clear yet.

DECLINE IN MORTALITY FROM RHEUMATIC HEART DISEASE

A recent report of the Registrar-General for England and Wales[4] shows that in recent years there has been a substantial decline in the mortality attributed to rheumatic fever. In the three years 1925–7 the death rates per million living at ages 5 to 15 were 75 for males and 90 for females; in 1937 they were 41 and 49. At ages 15 to 25 the death rates were 49 for males and 60 for females in the earlier period, and 25 and 33 in 1937. Broadly speaking, the mortality rate has fallen by 50 per cent. in ten years. A similar trend is reported from the United States by O. F. Hedley.[5] As most deaths from heart disease at ages 5 to 24 years are the result of rheumatic infection he adopts the recorded mortality of the former as an index of the trend, and racial and geographical distribution, of the latter. The annual death rates during 1930–6 were, he finds, less than the corresponding rates during 1922–9 in every section of the country and in every

[1] *Biochem. J.*, 1939, **33**, 1525.
[2] Ibid., 1538.
[3] Ibid., 1544.
[4] *Statistical Review for 1937*, 1940. Text. H.M. Stationery Office. (3s. 6d. net.)
[5] *U.S. publ. Hlth Rep.*, Wash., 1939, **54**, 2271.

State. In the United States as a whole the mortality rate was 192 per million living at ages 5 to 24 in 1922–9 and 139 per million in 1930–6, a reduction of nearly 30 per cent. (His basis, it will be noted, is a wider one than the Registrar-General's, the latter's figures for rheumatic fever including heart diseases only when the heart affection is designated as "acute [or subacute] rheumatic" on the death certificate.) While this improvement is a source of satisfaction it must not be forgotten that heart disease remains at these young ages one of the principal causes of death. The reason for the improvement is also obscure, for the cause of rheumatic fever is still unknown and we have no proved methods of preventing it, though with earlier detection and treatment the cardiac damage is probably more frequently averted. Hedley concludes that it is certainly not a mere statistical bookkeeping change, and puts forward a number of factors that may be relevant. It is the impression of many of the older clinicians, he says, that rheumatic fever may to-day be becoming milder. This would be on a par with the experience of scarlet fever, but only pushes the search for an explanation one stage further back. He boldly enters a controversial field in suggesting that the widespread removal of diseased tonsils may have been important. The fall in mortality has, of course, been associated in time with an improving standard of living and changes in diet, but so far attempts to incriminate dietary deficiencies have been unsuccessful. The incidence of rheumatic fever has, however, been reported to be higher in the poorer classes, and Hedley finds the mortality from heart disease appreciably higher among young negroes than among the whites, the economic position of the former being, on the average, certainly less favourable. On the other hand, mortality continued to decline during the years of economic depression. Other possible influences lie in improvements in the housing of the population and in the generally better child hygiene of to-day, with less overcrowding and less risk of infection with smaller families. The value of identifying the cause, or causes, of the fall in mortality would be, as Hedley points out in this preliminary report, that we might then be able still further to accelerate the decline.

FLUOROSIS

Small quantities of fluorine are usually regarded as essential for maintaining normal function. During the past ten years, however, evidence has accumulated to show that a slight excess of fluorine is very injurious to the teeth; indeed, it is now doubtful whether this element is essential at all. Evans and Phillips[1] maintained rats for five generations on a diet containing only traces of fluorine (not more than 50 μg. of fluorine per kilo body weight per day), and found that the addition of more fluorine did not improve the health, while an intake of about 5 mg. per kilo body weight per day caused bleaching of the teeth. Mottled teeth have been endemic in certain areas of the United States for some years, and in 1918 McKay pointed out that in Andover (South Dakota) the disease was associated with the use of water from artesian wells. It was in 1931 that Smith and Churchill established that mottling of the teeth was due to the presence of fluorine in the water. In extensive observations in a number of areas Dean and McKay[2] have found that where there is a concentration of one part per million of fluorine in the water 10 per cent. of the children have mottled teeth, and where the concentration is two parts per million the teeth of 50 per cent. of the children are so affected. Further, a concentration of 5 parts per million causes nearly a 100 per cent. incidence of mottled teeth and a 20 per cent. incidence of severe effects. The mottling appears on the teeth between the ages of 6 and 12 years, and the injury is permanent. Dean and McKay have shown that no fresh cases occur in the locality after a change over to a fluorine-free water supply; they point out, however, that it takes eight years for this to become apparent in the community. An otherwise laudable desire to improve drinking-water supplies by substituting artesian wells for surface water has been largely responsible for the increase in the incidence of this dental disease. Surface waters rarely contain fluorides, which, however, occur in about 85 per cent. of igneous rocks; thus water from deep wells may have a high fluoride content. Fluorosis is recognized as occurring in all continents. Pierce[3] points out that it is a widespread trouble among domestic animals, which in North and South America have mottled teeth like the children. Along the North African coast a disease of the teeth and bones of horses and cattle termed "darmous" is now recognized as being caused by fluorine. Cattle are also subject to special dangers from dust from various factories, particularly superphosphate factories. Natural phosphate deposits contain fluorine, and fertilizers made from rock phosphate may thus contain a considerable quantity of the element.

[1] *J. Nutrit.*, 1939, **18**, 353.
[2] *Amer. J. publ. Hlth.*, 1939, **29**, 590.

SAFETY ZONES

Probably with some presentiment of coming events affecting their three countries the Netherlands and the Belgian and Luxemburg sections of the International Law Association met in Brussels in April, and after a discussion in which many took part adopted a draft convention for the creation of zones of security in which the non-combatant population, especially children, might find shelter against aerial attack. The assembly were informed of the results of similar endeavours in recent wars, especially the zone of security in Shanghai for the civil population, in which 300,000 persons had found shelter during bombardment, and the measures in Madrid and Bilbao during the Spanish civil war. It was also stated that France and Germany had been engaged in obtaining mutual assent to measures for the immunity of certain hospital towns intended for the sick and wounded. A committee was appointed under the presidency of M. Devèze to continue propaganda in favour of the creation of such zones of security and to secure the adhesion of Governments to the draft convention. It will be recalled that at the International Red Cross Conference held in London in 1938 it was agreed to urge all Governments to arrange, in areas liable to be endangered by any military action, for the evacuation of women and children into zones of immunity under Red Cross protection. This was the unanimous resolution of the fifty-four National Red Cross Societies. The same conference carried a step further the long-debated question of hospital towns, and later, in October, 1938, a committee of military and legal experts met at Geneva to draw up suggestions for a convention for the establishment of hospital or sanitary zones in time of war. Representatives of the British, German, Belgian, and Polish Governments were on that committee. The proceedings seem to have a far-away sound now that "total war" is upon us.

[3] *Nutr. Abstr. Rev.*, 1939, **9**, 253.

MORGAGNI'S SYNDROME

In 1761 Morgagni was the first to record a number of conditions, some rediscovered later, such as the form of cataract and the small "hydatid" which bear his great name. But this is not all, for he reported hyperostosis of the inner table of the skull associated with virilism and obesity, which Henschen[1] in 1927 called "Morgagni's syndrome." Hemphill and Stengel[2] have now given a detailed account of three such cases, one with necropsy, with valuable observations on the histology of the bony, cerebral, and endocrine changes, and a review of the subject. The syndrome consists of diffuse hyperostosis of the vault of the skull, especially of the frontal and parietal parts of the calvarium, with nodular frontal endostoses, but without evidence of activity; diffuse degeneration, not senile, of all the elements of the cerebral cortex in the frontal and to a less degree of the parietal regions; in the anterior pituitary increased numbers of eosinophil cells and the presence of small eosinophil adenomas; signs of activity in the parathyroids; and some atrophy of the thyroid which may be correlated with obesity. Although with wise caution Hemphill and Stengel do not insist on a resemblance to acromegaly in the pituitary eosinophilia, and in the occasional combination of cutis verticis gyrata or bull-dog scalp with acromegaly, the polyglandular endocrine manifestations in Morgagni's syndrome are paralleled to some extent by those in acromegaly.

TOXOPLASMIC ENCEPHALOMYELITIS

In 1937 Wolf and Cowen[3] drew attention to parasitic form of human encephalomyelitis due to an organism resembling the *Encephalitozoon cuniculi* or, alternatively, *Toxoplasma*. The disease was identified in a newborn infant, and it appears certain that the infection was acquired *in utero*. Pathologically the central nervous system showed a disseminated granulomatous meningo-encephalitis, the optic nerves and retinae being also involved. The organisms were demonstrated in the stained sections, but in the absence of cultural and transmission experiments it was not possible to identify them with certainty. In 1938 Wolf and Cowen[4] reviewed five other cases from the literature in which the morphological features were similar. By this time they had had further opportunities of studying the appearances of a mouse strain of *Toxoplasma* in sections of fixed tissue, from which it was concluded that the morphological differences in such preparations between this organism and *Encephalitozoon cuniculi* were extremely slight. On account of the histological resemblance between the human disease and experimental toxoplasmosis in rabbits they inclined to the view that the human disease might turn out to be an encephalomyelitis due to *Toxoplasma hominis*. Wolf, Cowen, and Paige have now confirmed this view as a result of their investigations of a fresh case. The description[5] of the clinical and pathological features in this new example agrees in all essential respects with the original. In a separate report[6] they present the results of the inoculation of infected cerebral material into the brains of rabbits, rats, and newborn mice. Almost all of the rabbits and mice, but none of the rats, developed a disseminated meningo-encephalitis characterized by focal inflammation, necrotizing and productive lesions in which parasites were identified. Both the lesions and the parasites were closely similar to those observed in the human material. Parasites were also found in similar lesions in a number of other organs. The disease proved to be transmissible in series and was identified as a toxoplasmosis by the morphology of the parasite, the character of the lesions, and the results of cross-immunity experiments. Toxoplasma has a wide-spread geographical distribution and is pathogenic for a wide variety of hosts, but its natural mode of transmission is unknown. By what means an infant can be infected *in utero* while the mother remains apparently healthy is an interesting conundrum.

[1] Henschen, F. (1927). *Morgagni's Syndrome*. Jena.
[2] Hemphill, R. E., and Stenzel, E. (1940). *J. ment. Sci.*, **86**, 341.
[3] *Bull. neurol. Inst. N.Y.*, 1937, **6**, 306.
[4] Ibid., 1938, **7**, 266.
[5] *Amer. J. Path.*, 1940, **15**, 657.
[6] *J. exp. Med.*, 1940, **71**, 187.

PHARMACEUTICAL RESEARCH

The annual report of the research departments of the College of the Pharmaceutical Society records activities in a wide field. The record is particularly creditable because the departments have been scattered by evacuation. In spite of this difficulty research has been carried on in such subjects as pharmaceutical chemistry, pharmacy, biological standardization of drugs, and nutritive products. The range of subjects investigated is very wide and includes the synthesis of new acridine antiseptics, improvements in the biological standardization of vitamins and hormones, and the measurement of the disintegration rate of compressed tablets. The nutrition laboratory has measured the relative activities of calciferol (vitamin D_2) and vitamin D_3, which is identical with that occurring in fish-liver oils. The two substances were found to be equally potent, weight for weight, both on rats and on children. Calciferol had been found to be much less potent than vitamin D_3 when tested on chickens, and this fact raised doubts about the therapeutic value of calciferol. It is satisfactory to learn that this difference does not exist in the case of human subjects.

NOTICE TO CORRESPONDENTS

The need for strict economy in the use of paper for all purposes was emphasized by the Control of Paper Order made by the Ministry of Supply, which came into force last month. In view of the restrictions now imposed on the use of paper, and the increase in the rates of postage which came into operation on May 1, it will no longer be possible to acknowledge the receipt of letters and memoranda, etc., offered to the *British Medical Journal* for publication. The space devoted to correspondence has had to be curtailed, and readers are urged once again to be concise in all communications addressed to the Editor.

The next session of the General Medical Council will open on Tuesday, May 28, at 2 p.m., when the President, Mr. H. L. Eason, C.B., C.M.G., M.S., will take the chair and deliver an address.

News has been received from Southern Rhodesia of the death of Dr. D. Campbell Watt, formerly of Pietermaritzburg, a Vice-President of the British Medical Association.

We regret to announce the death at Exmouth in his seventieth year of Mr. L. B. Rawling, F.R.C.S., consulting surgeon to St. Bartholomew's Hospital.

PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

TREATMENT OF DROWNING AND ELECTROCUTION

BY

REGINALD T. PAYNE, M.S., M.D., F.R.C.S.

In this country 781 deaths from accidental drowning occurred during the year 1937, and 806 deaths from suicide by drowning. During the same year there were seventy-nine deaths from technical electricity but none from lightning, though in 1936 nineteen persons met their death in the latter way. Under war conditions it is certain that there will be an increase in the number of deaths due to drowning and to electrocution. These two apparently diverse conditions are linked together as common forms of asphyxial death, as conditions of suspended animation in which all the ordinary clinical tests for death are entirely fallacious, and as conditions requiring immediate, prolonged, and persistent artificial respiration. If the essential underlying factors in these two conditions were more fully appreciated and the value of prolonged artificial respiration more generally realized many more lives would be saved by the efforts of medical men, first-aid workers, and trained workmen.

Apparent death due to drowning or electrocution is likely to happen suddenly, unexpectedly, and dramatically, at sea, by the sea, in the river or swimming-bath, or in the home, factory, or power station, etc. Such accidents occur under conditions in which onlookers are apt to lose their heads, and in circumstances far removed from those of hospital practice. For these reasons I have concentrated mainly on those methods of resuscitation which can be applied at once and on the spot, and which do not involve the use of complicated apparatus such as is hardly likely to be available under the conditions in which these accidents usually occur.

In apparent death from drowning or electrocution immediate, prolonged, and persistent artificial respiration is the fundamental method of treatment.

Artificial Respiration

The method most often employed in this country, France, and the U.S.A. is that introduced by Schäfer, while in Central European countries Sylvester's method is favoured. Members of the St. John Ambulance Brigade are taught how to use Schäfer's method. Experimental work certainly suggests that Sylvester's is the more efficient in terms of pulmonary ventilation, but this fact alone is not an entirely adequate reason for abandoning a method as widely known and well established as Schäfer's. The following are the advantages of Schäfer's procedure: It is simple; it can be carried out unassisted if necessary; the prone position favours the drainage of fluid from the lungs, etc., in cases of drowning; and it is not essential to hold the tongue and jaw forward as with Sylvester's method.

It is impossible to be dogmatic as to which method should be employed in any given case. The choice may vary with the condition for which artificial respiration is being carried out, the personal knowledge, skill, and ability of the rescuer, the number of assistants available, and the presence of associated injuries. Obviously the medical man is likely to have more methods at his disposal than is the first-aid worker, who is usually conversant with one method only. It is more important that the artificial respiration be immediate, prolonged, and persistent than that any one particular method should be carried out.

The following details of Schäfer's method are based upon a paper by Bates, Gaby, and Maclachlan in the *Canadian Medical Association Journal* (1938, **39**, 120).

1. Rapidly remove from the mouth any foreign material such as weeds, false teeth, and tobacco. If the mouth is tightly shut pay no more attention to it till later. Do not stop to loosen the patient's clothing unless it is obviously tight. Every moment is precious.

2. Lay the patient on his belly, one arm extended, the other arm bent at the elbow and with the face turned outward and resting on the hand and forearm, so that the nose and mouth are free for breathing.

3. Kneel straddling the patient's thighs. Place the palms of the hands on the small of the back with the fingers resting on the ribs and the little finger over the lowest rib.

4. With the arms held straight, swing forward slowly so that the weight of your body is gradually brought to bear upon the patient. The shoulder should be directly over the hand at the end of the forward swing. Keep the elbows straight. This movement should take about two seconds.

5. Now immediately swing backwards and completely remove the pressure.

6. After two seconds swing forward again. Thus repeat deliberately twelve to fifteen times a minute the double movement of compression and release—a complete respiration in four or five seconds.

7. Continue artificial respiration without interruption until natural breathing is restored, or until there are unequivocal signs of death, such as rigor mortis, cooling of the body, or post-mortem staining.

8. When the artificial respiration has been started, and while it is being continued, get an assistant to loosen any tight clothing about the patient's neck, chest, or waist.

9. *Keep the patient warm.*

10. Give nothing by the mouth.

11. To avoid strain on the heart, when the patient revives he should be kept lying down and not allowed to stand or sit up. Hot drinks may be given after revival and the return of consciousness.

12. Artificial respiration should be carried on at the nearest possible point to where the patient received his injuries. *He should not be moved from this point until he is breathing of his own volition.*

13. Should it be necessary, owing to extreme weather conditions, other injuries, etc., to move the patient before he is breathing normally, artificial respiration must be carried on uninterruptedly during the time he is being moved.

14. A brief return of natural breathing is not a certain indication for stopping artificial respiration. At times the patient after a temporary return of natural breathing stops breathing again. He must be watched and, if natural breathing stops, artificial respiration must be resumed at once.

15. In carrying out artificial respiration it may be necessary to change the operator. This change must be made without interruption and without losing the rhythm.

16. If alone with the victim do not neglect to start artificial respiration at once—the first few minutes are valuable.

17. In apparent death due to drowning or electrocution the ordinary tests for death, such as pulse, heart sounds, respira-

tion, and corneal reflex, must not be accepted. Death should only be assumed in the presence of rigor mortis, cooling of the body, or post-mortem staining.

Drowning

Drowning accidents may be brought about by shipwreck or as the result of the victim's ignorance, foolhardiness, or fatigue; they may also be due to the onset of sudden illness or cramp or the presence of old-standing disease. But not all apparently dead persons die as the result of the drowning, as other causes may operate. Death from drowning is the result of asphyxia. Two modes of asphyxia are possible. In the one a small amount of water enters the larynx during the period of apnoea and leads to laryngeal spasm. Death is thus due to asphyxia. In the other group of cases spasm of the larynx does not take place, but a variable amount of water enters the trachea, bronchi, and lungs. The asphyxia in such cases results from waterlogging of the lungs. In other cases, again, there may be a combination of laryngeal spasm with some degree of waterlogging. In all cases blood is dammed back in the right heart and the venous system, while the left heart and arterial system are relatively empty.

In drowning accidents the victim is unconscious and not breathing, the pulse cannot be felt, and the heart sounds are inaudible. It cannot be too strongly stressed that in such cases the ordinary clinical signs of death are completely fallacious. In all cases the cardiac complexes remain for a considerable but undetermined period of time after the heart sounds have ceased to be heard with the stethoscope. For this reason the stethoscope is a poor guide for determining whether or not a drowned person is or is not beyond the possibility of resuscitation. Similar considerations also apply to apparent death after electrocution

After what period of immersion in water is recovery possible? To this it must be admitted there is no exact answer. The popular belief that recovery is impossible after immersion for four to five minutes is entirely fallacious. Recent evidence suggests that it is possible to be submerged in water up to half an hour and still live.

Treatment of Drowning

Because of the physiological considerations which apply in cases of drowning and the fallacious nature of the clinical tests for death in such cases, all victims must be given the benefit of the doubt, and death never assumed until rigor mortis, body cooling, or post-mortem staining appears. After removal from the water all signs of life may be absent for hours, yet the person may ultimately recover. The following are some of the special details which apply to the treatment of drowned persons.

1. Lift up the victim by the waist and allow water to run out of the mouth, pharynx, stomach, larynx, trachea, and lungs.

2. Lay the victim face downwards, preferably on some slightly sloping ground, with the head rather lower than the feet, and in the position already described under artificial respiration.

3. Pay particular attention to clearing the mouth, etc., of all foreign material, as the victims of drowning are specially likely to have the passages obstructed by weeds, etc.

4. Start artificial respiration at once, as already described in the section devoted to it. Continue this until either recovery takes place or unequivocal signs of death appear, such as rigor mortis, cooling of the body, or post-mortem staining.

5. Apply such of the adjuvants to artificial respiration (described later) as can be obtained in the circumstances of the particular accident.

Electrocution

As Jellinek puts it, "People have been killed or injured by atmospheric or technical electricity, by low or by high tension, by direct or alternating current, by low or by high frequency, and others in similar circumstances have not suffered any injury whatsoever." Electrocution may thus be the result of lightning or of any type of electrical accident. In electrical accidents it is often too readily assumed that all that matters is the question of voltage, on the assumption that the risks to life bear a simple relation to the voltage. This, however, is largely fallacious. The voltage factor is only one of many factors which must be considered in connexion with the accident, some of the others being the perfection of the contact, the duration of flow, the condition of moisture of the clothing and skin, the resistance offered by the body, and even psychological factors, such as the awareness of the individual of the possibility of a shock. In the case of lightning the victim is likely to be caught out of doors, while in the case of technical electricity the accident may occur in the power house, on the electric railway, or in the home, office, factory, etc., or out of doors in connexion with repairs to or work upon electric mains or cables. A proportion of these accidents will therefore occur under conditions of shelter.

These accidents, whether due to natural or to technical electricity, bring about their results in three ways. First, by the passage of the current through the central nervous system they produce unconsciousness and an acute bulbar palsy; secondly, they produce electrical burns; and, thirdly, fractures may result from the violent and spasmodic contraction of muscles. From the point of view of first-aid treatment in these cases it is to the injuries to the central nervous system that attention must be directed.

The victims of these accidents are often rendered unconscious by the passage of the current, or they may still be conscious but unable to release themselves from the contact. They are, however, rarely killed outright as the result of the electric shock. If unconscious they are really in a state of suspended animation. Respiration has ceased, the pulse is absent, the heart sounds are inaudible, and the normal reflexes can no longer be elicited. According to the ordinary clinical tests they are apparently dead; but in fact they are not dead, though they will certainly die if left untreated. Death is the result of an acute bulbar palsy which may lead to failure of the heart or of the vasomotor or respiratory system. As in the case of drowning, electrical conductivity of the heart persists for a considerable time into this phase of suspended animation, and normal rhythmical activity may be restored by prompt artificial respiration. Cerebral oedema may rapidly develop in some of the cases and be responsible for the motor agitation and for the prolonged periods of artificial respiration which are necessary at times.

Treatment of Electrocution

In the case of electrical accidents treatment will involve a consideration of the following aspects: freeing the victim from electrical contact; treatment of suspended animation; treatment of cerebral oedema; treatment of electrical burns; treatment of fractures and other injuries. Here the subject will be dealt with primarily from the point of view of first-aid treatment, and other aspects only considered briefly.

Freeing the Victim from Electrical Contact.—This will only apply in cases of injury from technical electricity. The victim must be freed as rapidly as possible. This will involve cutting off the current or removing the victim from the contact, whichever is quicker. Many fatalities can be prevented by cutting off the current the moment the accident is recognized. If this is not possible the victim must be dragged away from the contact, the greatest care being exercised or would-be rescuers may be electrocuted also. This may be carried out by the use of rubber gloves, with the hands carefully padded with newspapers, or by means of non-conductors such as a dry stick, broom handles, dry rope, or a dry coat. But in all cases this freeing must be done quickly and carefully. In cases where this is impossible it may be necessary to sever the source of electrical energy with an insulated tool such as an axe with a long wooden handle.

Treatment of Suspended Animation.—Immediately the victim is freed from the electrical contact artificial respiration must be started. The details of this have already been described. This artificial respiration must be continued systematically and rhythmically till normal respiration is established or until unequivocal signs of death occur. The victim of an electrical accident is in a state of suspended animation due to an acute bulbar palsy, a state from which recovery is highly probable if immediate, prolonged, and persistent artificial respiration is carried out. No attention or consideration should be paid to the information that the voltage producing the shock was a particularly high one or the knowledge that artificial respiration has been carried on for several hours without result. Bates has recorded a case of recovery from an electrical shock of 26,000 volts after artificial respiration had been carried out for eight hours. So far as I am aware this is the longest case on record. The victim must always be treated on the spot and no attempt be made to move him at this stage. At the same time such adjuvants to artificial respiration (described later) should be applied as can be obtained in the circumstances of the particular accident.

Treatment of Cerebral Oedema.—Many workers, especially Jellinek, have stressed the importance of carrying out lumbar puncture in cases which do not rapidly respond to artificial respiration and in cases in which either motor agitation or coma persists after the establishment of normal respiration. In electrical accidents the pressure of the cerebrospinal fluid may rise rapidly, and this may be one of the factors delaying successful resuscitation. The risks of lumbar puncture in these cases are negligible, since there is no tendency to bleed from cerebral vessels. It will be obvious that lumbar puncture can only be carried out in suitable surroundings and with medical assistance.

Treatment of Electrical Burns.—The extent and nature of the local lesions in electrical accidents vary greatly from case to case. These burns may include deep local lesions at the point of contact, surface burns of varying degree, and extensive charring of limbs or other parts of the body. When these burns are dealt with must depend upon all the circumstances attending the accident and the fact that nothing must be allowed to interfere with the continuance of artificial respiration. Superficial burns may be treated with tannic acid just as for burns from other causes. The deep eschars at the point of contact with the current may be similarly treated, though Jellinek, who has had considerable experience of these, favours conservative methods and the use of a lanolin dressing. In these deep electrical burns good healing occurs after separation of the dead tissue, and spreading infection is very rare.

Fractures and other injuries must of course be dealt with on general surgical principles.

Adjuvants to Artificial Respiration

The extent to which other methods of treatment are applicable in the circumstances of suspended animation following drowning or electrocution must depend upon the individual case; but in considering these adjuvants to treatment it must be remembered that there is no possible substitute for efficient artificial respiration.

Warmth.—Keep the victim as warm as possible by the use of clothing, rugs, blankets, bottles, or other means.

Massage.—Massage of the limbs, especially the lower, towards the heart will help to maintain the circulation and to stimulate body warmth.

Drugs.—Coramine, 1 c.cm., may be given either direct into the heart or into a vein. Atropine, 1/50 to 1/25 grain, may be of some use in decreasing foam and oedema in cases of drowning and in lessening cardiac inhibitory impulses in cases of electrocution. A capsule of amyl nitrite is of value in improving the efficiency of the coronary and pulmonary circulations. The use of adrenaline is debatable, and many workers consider it dangerous. The advantage of drug therapy is that it can be readily applied if a medical man is available.

O_2, CO_2 Intubation.—These methods will only be possible in special circumstances. A mixture of 5 per cent. CO_2 in oxygen is a most valuable adjunct to treatment. It should be given at the rate of three litres a minute and preferably through a laryngeal tube. Before doing this any froth or mucus in the larynx and trachea should be aspirated.

Rectal Salines.—These will help to maintain body warmth and the volume of the circulation.

Respirators.—If the victim has been transferred to hospital a Drinker or other form of respirator may prove invaluable for maintaining artificial respiration for long periods.

Following the successful resuscitation of the victim of drowning or electrocution the next step is to ensure that nothing is done to increase the risk of subsequent complications. It is no use recovering a person from drowning if he is to be allowed to die from pneumonia as the result of inadequate care following successful resuscitation. What steps are necessary in the individual case must be determined by the medical adviser in the light of all the circumstances.

Summary

The victims of drowning and electrocution are in a state of suspended animation.

In such conditions the ordinary signs of death—namely, absence of pulse, heart sounds, respiration, and reflexes—are completely unreliable.

In the case of drowning recovery is possible after immersion for a considerable period, even up to half an hour or more.

In the case of electrocution the period of suspended animation may extend to eight hours or more and yet recovery still take place.

In electrical accidents do not be unduly alarmed by the knowledge that the voltage was very high, and do not be reassured by the knowledge that the voltage was relatively low.

In all cases treatment must be immediate and on the spot. Seconds may be valuable.

Treatment must be by artificial respiration, which must be immediate, prolonged, and persistent, and until natural breathing occurs.

The type of artificial respiration employed must be determined by the nature of the accident, the skill, ability, and experience of the rescuer, and the presence of complications.

Artificial respiration must be continued until the victim is breathing of his own accord or until unequivocal signs of death appear.

Adjuvant methods of combating shock and maintaining the circulation must be employed in so far as they are practicable in the immediate circumstances.

Nothing must be allowed to interfere with the efficiency of artificial respiration.

Team work may be necessary.

If it is decided to remove the victim to hospital there must be no interruption of artificial respiration.

In the suspended animation following drowning and electrocution the only certain signs of death are the development of rigor mortis, cooling of the body, and post-mortem discoloration.

The first-aid methods of resuscitation can be applied by a medical man, a first-aid worker, or a trained workman.

The methods of resuscitation which have been described are also applicable to asphyxia following poisoning by carbon monoxide or car fumes, etc., and to asphyxia following an overdose of drugs.

In all cases in which artificial respiration has been successfully carried out the victims must be guarded from subsequent complications by adequate care and nursing.

A KEY TO PSYCHIC CONFLICTS

BY

Sir WALTER LANGDON-BROWN, M.D.

Jung, like Freud, attaches great importance to the unconscious, but like Adler strongly believes in "holism," to use General Smuts's term. The upholders of either view are therefore apt to follow Freud in one case and Adler in the other. Consequently there has been a tendency to neglect the more nebulous psychology of Jung. This is unfortunate, for he of all men is best qualified to reconcile science with spiritual values. Man is more than a bundle of conditioned reflexes and behaviourism, and can never remain satisfied by psychology without the psyche. It has been suggested that it would be well to study the simpler Adlerian philosophy of social co-operation on the way to the study of Jung. For with him lies the future of a psychology that can best explain and meet the deepest emotional needs.

The neglect of Jung's views compared with those of Freud and Adler in this country is partly due to the paucity of expositors. Since the death of Dr. Constance Long, Dr. Baynes has been almost alone in the field. We therefore welcome his *Mythology of the Soul*.[1] Although he freely acknowledges Jung as the father and "onlie begetter" of the book he elaborates a technique for exploring the unconscious, and in his introduction makes a fascinating contribution to the diagnosis of present-day discontents by a study of the schizophrenic make-up. This is a legitimate procedure which has been helpful in other branches of medicine. Just as the description of fully developed myxoedema was followed by the recognition of minor forms of thyroid defect, so a study of the full-blown schizophrenic reveals similar characteristics in states and persons who presumably regard themselves as sane. In Dr. Baynes's opinion schizophrenia raises a vital question not only for the individual but for Western civilization—namely, the stability of consciousness when threatened by the archaic forces of the collective unconscious. The renegade in the psyche is nihilistic, seeking violence involuntarily as an insecure ruler seeks war. To-day there is a schizophrenic doubt developing at the very root of our way of life, concerning the value and meaning of the whole civilizing experiment. It is impossible to live in the modern world without being affected, as by a contagion, with a condition of the collective psyche not unlike the state of severance and dissociation found in the schizophrenic individual. Acute transitional phases in history have always offered occasion for the biased fanatical personality to assume leadership, just because the collective psyche of the time demands these very qualities. The relative popularity of systematized schizophrenic material, such as James Joyce's *Ulysses*, and a considerable bulk of surrealist painting and poetry points to the existence of a large number of individuals who discover themselves best in a pathological looking-glass. Symptoms presenting an unmistakable analogy to schizophrenic pathology are widespread, arising from narrow, one-sided ideologies that must for ever seek to annihilate the other half of mankind, for collective fanaticism cannot live without scapegoats.

All the absolute collective values which ruled the world up to 1914 have undergone a wholesale landslide; standards which to our forefathers were absolutely binding have been doubted and reduced by the all-pervading principle of relativity. Nations as well as individuals adopt an almost cynical opportunism towards long-standing obligations; people have become hardened to the most shameless persecutions, betrayals, and predatory invasions in the name of the deified modern State. Yet underneath the constantly shifting surface of this moral avalanche there is a profound longing for deliverance and for some undeniable realization of truth. The cataclysm of 1914 marked the end of an epoch and the beginning of a vast spiritual migration. Christendom received a terrible lesion, as though a sudden and violent storm had sundered man from his ancient roots, leaving him at the mercy of irrational collective forces. These changes are too near to us for accurate understanding. Dr. Baynes feels that the best that can be attempted is to express the situation by analogy with schizophrenic pathology, and this he proceeds to do with the aid of a special technique.

His method is to encourage the patient to try to draw pictures illustrative of the ideas which are surging up from his unconscious, just as the modern psychotherapist encourages the child patient to express his problems in his play. It appeals to us as a sound plan, for it is well recognized that artistic impulses come from the unconscious. In the first case the patient had no technical skill, but it is of great interest to observe that while some of his pictures are exactly like those drawn by children, others at once recall the type of paintings executed a few years ago by two well-known artists during their mental eclipse. There is also the recurrent drawing of cones and vortices such as are commonly seen in the decoration of the most primitive pottery. All three points are therefore characteristic of regression. Almost always there is an actual split in the design, until the latest drawing, which in its unified pattern symbolizes the resolution of the patient's conflict. It is worth observing that this patient was a medical man who had read Freud; this may account for the frequent recurrence of Freudian idioms and for embryological similes which could only occur to one with a biological training. It recalls Adler's remark that nothing is so entirely conscious or unconscious as we imagine, and adds point to Dr. Baynes's preference for the term "autonomous psyche." The second patient had much greater technical skill. Yet it is of interest to observe the varying amount of distortion introduced into his drawings at certain stages in the analysis—also the surrealist style of many of them. In one the "split mind" is symbolized by a zigzag crack diagonally across the drawing.

When Dr. Baynes speaks of the patient's amazement at discovering the door through which he can gain access to the world of the unconscious we are reminded of H. G. Wells's striking tale, *The Door in the Wall*, an artistic representation of the same idea. It suggests an answer to a puzzling question: If schizophrenia is psycho-

[1] *Mythology of the Soul. A Research into the Unconscious from Schizophrenic Dreams and Drawings.* By H. G. Baynes, M.B., B.Ch.Cantab. (Pp. 940; 53 illustrations. 32s. 6d.) London: Baillière, Tindall and Cox. 1940.

genic, how is it relieved, as it undoubtedly often is, by such a material measure as insulin shock? May it not be that the resulting "internal asphyxiation" of certain nerve cells closes the door by breaking the synapses?

Dr. Baynes analyses these drawings with great skill and subtlety, sometimes perhaps with almost excessive subtlety; for their interpretation he has ransacked the literature and mythology of the East and West; his industry has been enormous and the results are important and illuminating. We wish he had provided a table of contents to guide the reader, and if he could add to our indebtedness by an abbreviated account of his general conclusions it would widen the influence of his work. Every reader will draw him own moral from this remarkable book. We would express ours thus:

Here the *catharsis* of tragedy by pity and terror is seen from a rather different angle—namely, the appeasement of the autonomous psyche. The Greeks of all people possessed the power of symbolizing psychic conflict in beautiful myths and significant drama. The struggle between chthonic daimons and the sky gods of Olympus is in effect the story of this book. The resolution of that conflict by integration and sublimation is, for instance, beautifully portrayed as stages in the apotheosis of Dionysus on the reliefs in the Athenian theatre dedicated to him. Such ideas were the keynote of Greek art. The disturbed conditions of to-day demand a different mode of expression, and it is highly significant to find coherence replaced by many features also characteristic of schizophrenics: futurism, vorticism, cubism, surrealism, and the distortions of modern sculpture all appear in the drawings of these patients. It is as if artists had tried to warn us of an imminent explosion from the collective autonomous psyche. Professor Wood-Jones has reminded us that the making of tools was man's earliest intellectual manifestation; hence the persistent tendency to mechanistic modes of thought. We are now realizing that as mechanical has consequently outstripped psychical development the neglected and frustrated unconscious has turned renegade with uncomfortable consequences. Yet Dr. Baynes's conclusions are not so pessimistic as might appear; he sees the present condition as the birth pangs of new conceptions, and, as Dean Inge puts it, "in the history of ideas, death in child-bed is the rule rather than the exception." Such phases always induce excesses; the Renaissance liberated men's minds but led to such licence that Caius regretted he had ever encouraged the new learning; the terrors of the French Revolution, which turned Burke into a reactionary, marked a new orientation. Copernican cosmology, Darwinian evolution, and Freudian psychology each in turn perturbed and distressed men's minds. Even Einstein's theory of relativity is now pleaded as an excuse for the overthrow of moral standards. Whether civilization can be preserved without yet more serious regression depends on whether we have the wit to face the present crisis with wisdom.

In a paper on post-operative enterocolitis (*Archives of Pathology*, June, 1939) A. Penner and A. I. Bernheim report that following a variety of operations, and in cases of burns and severe gastro-intestinal haemorrhage, certain patients developed a haemorrhagic diarrhoea with terminal hyperpyrexia. At necropsy a focal haemorrhagic necrosis of the small or large intestine is found, with extreme oedema, vasodilatation, and hyaline thrombi. Peritonitis is sometimes present, but a notable feature is the lack of involvement of the deeper layers of the intestinal wall; bacteriological examination failed to reveal the presence of abnormal organisms. Cases showing evidence of mesenteric thrombosis or intestinal disease were excluded. It is suggested that this disorder (the literature is reviewed and forty cases are described) is consequent on severe shock, which was a common factor in all the observed cases. The lesions are analogous to those seen in experimental shock in animals.

LEPROSY IN THE BRITISH EMPIRE

The annual general meeting of the British Empire Leprosy Relief Association was held at the India Office on May 6 under the chairmanship of Mr. MALCOLM MACDONALD, then Secretary of State for the Colonies and now Minister of Health. Sir WILLIAM PEEL briefly reviewed the work of the year, and Dr. E. MUIR, the medical secretary, gave an account of his experiences and impressions during a recent visit to South and West Africa and Cyprus, undertaken with a view to studying leprosy in those parts of the Empire and advising their Governments and medical departments on anti-leprosy measures. A large number of devoted and skilled medical men overseas are spending many years of their lives treating and controlling leprosy, but their isolation, especially in such places as the African bush and the Indian jungle, may have a slackening effect even on the keenest investigators, and therefore the Association sends out its medical secretary from time to time to stimulate and encourage these workers.

Susceptibility of Europeans

Dr. Muir gave one example of the kind of problems which had to be faced. The largest leprosy institution in South Africa, at West Fort, Pretoria, houses ninety-five European patients and 681 natives. On examination it has been found that of the twelve Europeans admitted during last year all had leprosy of the severe infectious type, whereas only 25 per cent. of the natives had that type, the remainder having the milder non-infectious form. As all lepers are compulsorily segregated in South Africa, this difference cannot be the result of selection. Later in his tour Dr. Muir examined all the European lepers in Cyprus and found that the leprosy was almost universally of the severe type. Is it something in the dark-coloured races of Africa which makes them less susceptible than the fair-skinned Europeans? And if Europeans are more susceptible, why has leprosy died out of most parts of Europe while it lingers in most parts of Africa?

In East Africa Dr. Muir found many settlements in clinics in charge of European sisters and African assistants, but with little or no medical supervision. If these workers were trained and advised by a leprosy expert who would visit them periodically results of great value might be forthcoming. A suitable doctor is available, and the Association has offered £350 a year towards his salary, provided the balance is found either by the Colonial Office or by the four or five countries concerned whose medical directors have approved the scheme.

Village Clinics in Nigeria

From the leprosy point of view the most important country in Africa is Nigeria, where there are thought to be 400,000 lepers out of a population of 24 millions. There are fourteen leprosy settlements in Nigeria, and an interesting experiment of village clinics is in progress at the large settlement at Uzuakoli, in the south-east. At the request of the village authorities the settlement doctor makes a leprosy survey of a particular village on the understanding that a well-built sanitary hamlet will be constructed for all the lepers on a spot about a mile away. At the same time anti-leprosy treatment is provided in a small building in the village itself. The new hamlet is erected under European supervision and with the help of a trained ex-leper from the settlement, who remains on the spot, while another ex-leper trained in medical work is left as a dresser to attend the patients between the weekly clinic days. Already eight of these centres have been started and 1,243 patients are isolated and under treatment.

Dr. Muir has lately been in touch with the doctors at the leprosy institution at Chiengmai, Northern Siam, who have been working on leprosy treatment along entirely new lines. The results appear to be promising, and trials have been arranged in four or five important leprosy centres throughout the world. Until reports are received, judgment on the tentative results of the workers in Siam must be suspended.

NEW NAMES FOR DRUGS

We publish below the pharmacopoeial names chosen by the British Pharmacopoeia Commission for certain proprietary drugs. It is pointed out that this is part of the war-time effort to secure the continuance of the supplies of these drugs, and it is much to be desired that a name which is free from trade-mark rights and which can be used by any manufacturers should come into general use by medical men. There is a regrettable tendency for manufacturers of British equivalents or alternatives for drugs previously manufactured abroad to introduce their own proprietary names for them. This diversity of nomenclature can only mystify and confuse the practitioner who uses the drugs. We need only recall the various names for new chemotherapeutic compounds and for endocrine preparations to illustrate this confusion.

British Pharmacopoeia

The General Medical Council proposes to publish in due course, in an Addendum to the *British Pharmacopoeia, 1932*, monographs dealing with certain substances which are now being produced, or are likely shortly to be produced, by British manufacturers, in some instances under licences granted by the Comptroller of Patents. The registered trade names of these substances are given below, together with the names adopted as official pharmacopoeial titles.

Proprietary Name	*Pharmacopoeial Name*
Atebrin	Mepacrine hydrochloride
Atebrin musonate	Mepacrine methanesulphonate
Avertin	Bromethol
Cardiazol	Leptazol
Coramine	Nikethamide
Doryl	Carbachol
Evipan sodium	Soluble hexobarbitone
Fouadin	Stibophen
Germanin (Bayer 205)	Suramin
Plasmoquin	Pamaquin
Prominal	Phemitone
Uroselectan B	Iodoxyl

Clinical Trials by the M.R.C.

Since the outbreak of war the Medical Research Council has taken steps, in consultation with the Government Departments concerned and with the Association of British Chemical Manufacturers, to ensure that important synthetic remedies previously obtained from abroad will still be available to the medical profession. In some cases the substances concerned can be so adequately tested for identity and purity by chemical means that no question of the equivalence of the British preparations can arise. In certain cases, however, the Council thought it desirable to arrange thorough comparative trials in suitable clinical centres, in order to assure itself and the Government that substances of British manufacture were equivalent in all respects to the corresponding proprietary products previously imported and known to the medical profession under trade names. British preparations of the following substances have already been the subject of such clinical trials. The unprotected names in the second column under which the corresponding British products are mentioned are those recommended for eventual adoption by the British Pharmacopoeia Commission.

Avertin	Bromethol
Atebrin	Mepacrine hydrochloride
Evipan sodium	Soluble hexobarbitone
Uroselectan B	Iodoxyl

If similar comparative trials of other substances are undertaken in the future these will be reported from time to time.

The history, chemistry, and physical and mental effects of the Mexican drug mescaline are reviewed in the *Rivista Sperimentale di Frenatria* of June 30, 1939. Cucchi describes the results of administration of 0.3 gramme in six intelligent subjects; four showed euphoria, one depression. He concludes that the drug is of no value for the "facilitation" of confession by accused persons.

INTERNATIONAL LEAGUE AGAINST RHEUMATISM

AMERICAN COMMITTEE'S STATEMENT

The American Committee of the League, with the American Rheumatism Association, has issued a statement on the postponement of the American Congress on Rheumatic Disease, signed by Ralph Pemberton, president of the League, Philip S. Hench, president of the American Rheumatism Association, and Loring T. Swaim, secretary. It begins: "The sixth Congress of the Ligue Internationale contre le Rhumatisme was held in England in the spring of 1938. It was an unqualified success from every point of view; the attendance was large, the scientific sessions were profitable, British hospitality was lavish, and social entertainment, academic and medical, was unstinted. At the meeting of the League Council at Oxford an invitation to hold the next congress in the United States in 1940 was accepted with enthusiasm, and Dr. Ralph Pemberton of Philadelphia was elected president of the League."

A most attractive programme for the American Congress (June 1–8, 1940) was later drawn up, including the main sessions under the auspices of the University of Pennsylvania, in connexion with its bicentenary, and many functions in New York, with cordial co-operation of medical and public bodies. By a resolution passed by both Houses of Congress, and approved by the Secretary of State, the President of the United States was authorized and requested to invite the Governments of all countries in which a branch of the League existed to send delegates to the International Congress in America. The president of the League, Dr. Pemberton, himself paid a visit to South America and met with much enthusiasm for the congress, which augured large support from South American countries.

When the horizon was narrowed by war in Europe Dr. Pemberton and his colleagues were obliged to recognize that it would be unwise to attempt the calling together of the seventh congress in the present year. In a covering letter to the statement he calls the attention of all members of the League to the conviction of the American members and of the Association, in which he fully shares, that the present structure and personnel of the League should be maintained—perhaps in a condition of suspended animation during the war, but ready to resume its activities as soon as circumstances permit. Contrary to another interpretation which has been put upon this postponement, the international functions of the co-ordinating organization may be in abeyance, but are not at an end.

MEDICAL SICKNESS ANNUITY AND LIFE ASSURANCE

Presiding at the annual general meeting of the Medical Sickness Annuity and Life Assurance Society, Ltd., at Lincoln House, High Holborn, on May 6, Dr. F. C. MARTLEY, chairman of directors, said that it was a source of satisfaction that the figures for new business had been well maintained. A certain reduction was inevitable, but it had not been so severe as was anticipated. Until the war broke out the figure was well above that for the corresponding period of the year before; for the last four months of 1939 it dropped by about 50 per cent. The directors had decided to allocate £100,000 to a special war emergency reserve fund to cover so far as possible any depreciation in assets as a whole, and to leave the ordinary reserve fund as it was. Holdings in British securities had been increased, and £41,300 of the new 3 per cent. War Loan had been taken up.

War Claims Concession

For the present the Society had ceased to grant loans on practices or houses. Great caution would have to be exercised in buying or selling practices after the war; an entirely new method of valuation might have to be introduced. In dealing with difficult war problems the directors, although war claims were expressly excluded under the conditions of all policies under the sickness fund, had resolved that war claims from members on active service or in H.M. Forces originating abroad should be eligible for full benefit up to a period of

thirteen weeks *ex gratia* from the date of their arrival in the United Kingdom, further benefit at the end of that period to be subject to individual consideration; that the same conditions should apply to civilian members or members in H.M. Forces in the United Kingdom who might be totally incapacitated by conditions due to the war, and to deferred policies (the period of deferment to begin from the date of arrival in the United Kingdom unless it was in the United Kingdom that the incapacity arose). Dr. Martley added that this arrangement, which closely followed the one obtaining in 1914-18, might have to be modified or even cancelled in the light of experience, but it was hoped to continue it throughout the war.

The chairman referred with regret to the resignation of Dr. Knowsley Sibley as director, after having served the Society in various capacities since 1892; also to the death of Mr. Holton Sturges, auditor for nearly thirty-five years. Mr. Bertram Sutton was due to retire in November last after forty years' service, but had consented to remain.

A resolution was carried on the recommendation of the Board that no interim bonus be paid on with-profit policies for this year, but that bonuses be paid at the same rate declared at the last valuation for the three years 1937-9 on all policies becoming claims during the year 1940.

A VISOR FOR THE PREVENTION OF WAR BLINDNESS

BY

SIR RICHARD R. CRUISE, G.C.V.O., F.R.C.S.

At the annual congress of the Ophthalmological Society in 1917 I read a paper on the protection of the eyes in warfare in which I recommended the attachment of a visor to the steel helmet. As a result of intensive experiment during the past months I have, with the aid of the Fairey Aviation Company, invented the visor illustrated here.

I have pointed out that fragmentation from explosives is the primary cause of war blindness, and in this war the volume of explosives, especially from aeroplane bombing, will be enormously increased. The majority of the ocular injuries in the last war were the result of quite small fragments penetrating the eye, and most of these

FIG. 1

were metallic. The injuries included punctured wounds, panophthalmitis, foreign bodies in the globe, lacerations of the cornea or sclerotic, prolapse of the iris, concussion injuries to the retina. It is my belief that well over half the cases of blindness in the last war could have been prevented by such a form of protection as the visor now invented. Between 1914 and 1918 approximately 2,000 were blinded in both eyes and 40,000 blinded in one. Apart from any other considerations it is surely fundamental that prevention should precede treatment, and that this protection against blindness should be adopted immediately; otherwise we shall once more run the risk of being wise after the event.

The visor consists essentially of a perforated sheet of duralumin, 22 gauge, moulded so as to fit the inner curvatures of the steel helmet, to which it is attached by rivets. A spring adjustment enables it to be kept within the helmet and facilitates easy lowering when this is required. The weight of the visor complete with adjustments is just on four-tenths of 1 lb. and the cost

FIG 2

FIG. 3

is small—compared with the cost of pensions for blindness it is infinitesimal. I tested the visor by firing at it with a 12-bore shotgun, and found that there was no penetration of the visor at a distance of 30 yards; whereas the unprotected eye would be completely destroyed at even twice the distance.

In conclusion, I would point out that the Ophthalmological Society of the United Kingdom passed a resolution at its meeting on April 25 this year unanimously recommending the adoption of the visor, and sent the resolution to the Admiralty, the War Office, and the Home Office.

The report of the National Physical Laboratory for 1939 (H.M. Stationery Office, 2s. 6d. net) appears in abbreviated form, but the work it records is as voluminous as ever. As with most other organizations, the Laboratory had its routine sharply altered by the war, which called for a considerable expansion of the work done for the Services. But there has been no great falling off in the work done on behalf of industry, and no dispersal of the scientific staff has been permitted. Among the routine work has been the measurement of radium against the British radium standard; 15 grammes of radium was measured in 1939, including some 12 grammes for the National Trust. The inspection, repair, storage, and distribution of about 400 needles and tubes containing in all 2½ grammes of radium have also been undertaken for the various national centres. Another piece of work has been the testing of three-quarters of a million clinical thermometers. A new field of enterprise for the Laboratory has been opened up by the introduction of the "black-out," and much work has been done on the transmission of light through textiles, the shielding of lights, and so on.

Nova et Vetera

PLASTIC SURGERY IN REGENCY TIMES

On May 20 there will be sold at Messrs. Sotheby's auction rooms a presentation copy from the author of an interesting book on plastic facial surgery, published in 1816, by a somewhat eccentric surgeon and anatomist named J. C. Carpue. In this book he describes successful operations which he performed on two officers, each of whom had suffered through war wounds the loss of the greater part of the nose. The method used in both cases was by turning down a flap from the forehead. He prefaces the accounts of the two cases, which are illustrated by beautifully executed tinted plates, by a summary of the literature of plastic surgery. From this it appears that in a MS. of 1442 Branca, or Brunus, a Sicilian surgeon, described methods of plastic surgery of the face by grafts both from the forehead and the arm. He gives other references from Paré, Vesalius, Schenck, and Taliacotius: the last published a treatise on the subject in 1597.

Joseph Constantine Carpue (1764–1846) was born at Brook Green, near Hammersmith, immortalized in one of Kipling's early stories, "Brugglesmith." He was educated at first for the Jesuit priesthood, but was attracted away from it in turn by bookselling, the stage, and surgery. He went to St. George's Hospital, and on qualification was appointed surgeon to the Duke of York's Hospital at Chelsea. He resigned this after twelve years and became surgeon to the National Vaccine Institution; the latter post he held up to his death. He was, however, best known as a teacher of anatomy: his classes were thronged with students, and the public became cognizant of him when Hood guyed him in a poem, which runs more or less as follows:

> The body snatchers came along,
> They made a snatch at me;
> It's a funny thing them kind of men
> Can't let a body be.
> * * *
> I can't tell where my head is gone,
> But Dr. Carpue can;
> As for my trunk, it's all packed up
> To go by Pickford's van.

Carpue became a Fellow of the Royal Society, but was evidently looked at askance by the leaders of the medical profession: he never obtained an appointment at a recognized school either as surgeon or lecturer, nor was he ever chosen as examiner by the Royal College of Surgeons or elected to their Council. He dabbled in politics without any marked success, and died at the age of 82 after injuries sustained in an accident on one of the early railways.

Reports of Societies

SURGICAL TREATMENT OF ULCERATIVE COLITIS

At the May meeting of the Section of Proctology of the Royal Society of Medicine, with Mr. J. P. LOCKHART-MUMMERY in the chair, a discussion took place on the surgical treatment of idiopathic ulcerative colitis and its sequelae. Dr. CUTHBERT DUKES exhibited a number of specimens illustrating the disease in its acute and chronic manifestations and also its complications.

Mr. L. E. C. NORBURY said that although the condition was called ulcerative colitis it was uncommon, except in very advanced cases, to see ulcers of any size. Columns of oedematous mucous membrane corresponded to the position of taenia coli. In the more severe cases the epithelium seemed to have almost completely disappeared, giving the bowel a raw appearance. Thickening of the bowel wall interfered with the nerve supply, which explained one of the features of ulcerative colitis—namely, the increased peristalsis of the entire gastro-intestinal tract. He pleaded for the more extensive use of appendicostomy as a means for colon irrigation and application of medicaments, not only in late cases but in those of moderate severity. Of twenty-seven cases operated on during the last ten years, with others of longer duration, eleven were males and sixteen females, between the ages of 23 and 63 years. Four severe cases were fatal, but there was steady improvement in the remainder, with gradual return of mucous membrane to normal in most instances. After appendicostomy the sigmoidoscopic appearances tended to remain unchanged for a long time, although clinically there was improvement. Appendicostomy was a life-saving operation in many cases. Among other points in the surgical technique he stressed the importance of not opening the appendix until some days after operation, to avoid infection of the wound; the advisability of not closing appendicostomy because of possible relapse; the use for irrigation of two pints of normal saline solution, warmed and run in slowly, morning and evening; the need for determining progress by periodical sigmoidoscopy; and the value of blood transfusion. As for other operations, valvular caecostomy might be performed when the appendix could not be utilized. Terminal ileostomy should be reserved for advanced cases or cases in which appendicostomy had failed. Colectomy appeared to be unnecessary in the earlier stage of the disease and dangerous in the later.

Indications for Operation

Mr. W. H. OGILVIE knew that appendicostomy was warmly supported by many, but the evidence that these cases did better than under medical treatment was unconvincing. Caecostomy was not obviously superior. Neither of these operations rested the colon, nor allowed it to be washed out in a manner much better than from below. Many cases were arrested by medical treatment, and patients returned, if not to perfect health, to a state in which with care they could avoid relapses and lead a fairly useful life. Absolute indications for radical operation were stricture of the colon; also fistula, especially ischio-rectal. Presumptive indications were repeated large haemorrhages, constant blood loss of lesser degree but necessitating occasional transfusion, and relapses after continuous treatment in spite of intervals of fair health; also a segmental distribution, particularly if it involved the proximal colon only. The most important contraindication was the fulminating type of discharge, though it was just in these cases that some surgeons advocated operation. Surgical treatment consisted of three steps: exclusion, excision, and restoration. Total exclusion of the colon by transverse ileostomy was highly important. American writers laid stress on the loss of fluids with ileostomy, but he himself had not found dehydration a problem; at all events, it was more than compensated for by the rapid decrease in toxic absorption. Colectomy could be done as soon as the patient's general condition could stand such an operation, which was not so dangerous as its name suggested. Implantation of the ileum into the rectum that was still ulcerated was most unsatisfactory, and certainly worse than ileostomy.

A Plea for Appendicostomy

Mr. W. B. GABRIEL said that the researches of Lium on colonic transplants in dogs had shown the importance of spasm of the colon in relation to ulcerative colitis. Spasm of the colon might occur in nervous individuals from repeated emotional disturbances, also from vitamin deficiency (A and B), from dysentery toxins, and from trauma. Many cases of generalized proctocolitis, if treated early, would clear up with rest in bed in a quiet and suitable environment, with sedatives such as luminal, vitamin therapy, and a low-residue diet. Surgery was indicated when, in spite of correct medical treatment, the patient became steadily worse, with increasing anaemia from continued loss of blood per rectum; when signs of toxaemia developed; when there were frequent disturbing bowel actions; and in the fulminating type of case in which the illness had lasted only for a few weeks. Appendicostomy was the safest, easiest, and most rational surgical treatment. It allowed the instillation of oil (olive oil or cod-liver oil) into the colon at night and the wash-out in the morning.

Appendicostomy should be combined with suitable medical treatment and blood transfusion. In very ill subjects the operation should be done under local anaesthesia. The appendix should not be cut across until between five and seven days after operation in order to avoid wound sepsis.

A Physician's View

Sir ARTHUR HURST said that Lium's work in connexion with the aetiology of ulcerative colitis was entirely fallacious. He put the whole condition down to spasm; it might be so in dogs, but not in human beings. It ought to be realized that there was such a thing as medical colitis. He gave his series of private cases up to 1937. Out of a total of eighty-five 77 per cent. were well and carrying on, 10 per cent. were not well, 2 per cent. were definitely ill, and the total mortality was only 9 per cent., which was less than half the mortality quoted for cases in which appendicostomy had been done, and his series included some severe ones. He believed appendicostomy to be of no value at all. The proper operation when one was required for ulcerative colitis was ileostomy. The reason why cases treated by ileostomy in America, according to reports, showed unsatisfactory fluid loss was that these cases had enteritis as well as colitis. He had encountered no great trouble with ileostomy in the shape of fluid faeces.

Mr. LOCKHART-MUMMERY gave details of forty-four cases in which appendicostomy had been done: twenty-one were cured, sixteen relieved, and seven died. Four of the deaths occurred in children under 12 years of age. Of four cases in which caecostomy was done one was cured, one relieved, and two died. The relieved case had a caecostomy ten years later and a stricture in the rectum. Mr. R. S. CORBETT said that the indications for such a drastic course as terminal ileostomy were (1) certain fulminating cases where a patient was suffering from diarrhoea, wasting, and high fever, and showed no response to medical treatment; and (2) recurrent cases in which again there was no response to treatment and the condition was becoming more serious.

Dr. S. W. PATTERSON gave some statistics from Ruthin. Of forty-eight patients with ulcerative colitis nine had died; operation was performed in eight, and among these there had been one death. Comparable figures were forthcoming from Birmingham General Hospital: ninety-five cases, thirty-one deaths; twenty-five cases operated, with eleven deaths; and also from the Mayo Clinic: 687 cases, 148 deaths; 192 cases operated, with sixty-seven deaths. Mr. MICHAEL SMYTH referred to the difficulty of getting cod-liver oil in to any distance, unless an emulsion were made of it, through an appendicostomy opening. Mr. E. T. C. MILLIGAN differentiated between the granular and the ulcerative type. At one time he had thought they were two diseases, but he was of that opinion no longer. In the granular type there was no spasm and no toxaemia. It was important, if the patient had a granular proctocolitis, to reassure him that he would be better. Mr. NAUNTON MORGAN agreed that cases of granular proctocolitis might get better, but on the other hand some of them went on to the ulcerative condition. When the colon had got to the stage at which it was not likely to recover, then ileostomy was indicated. Stricture of the colon was another indication, but this might be treated by short-circuiting. Mr. DICKSON WRIGHT mentioned the severe crippling arthritis which developed in many of these cases. It cleared up after the total removal of the colon from end to end in two stages. He agreed that medical treatment should be pursued as far as possible, because there was no disease in which the patient might come so near to death and yet for some reason take an upward turn to recovery. The patient might be dehydrated and emaciated to the last degree, and then suddenly begin to get well. Mr. O. V. LLOYD-DAVIES said that the granular type was so closely associated with relapses and remissions that much confusion resulted and false treatments received credit. He was in favour of ileostomy when the condition demanded it, and up to that time he thought medical measures and palliative treatment should be given.

BLOOD TRANSFUSION

At the April meeting of the Pathological Society of Manchester, with the President, Dr. A. HILLYARD HOLMES, in the chair, Dr. J. GOLDMAN opened a discussion on blood transfusion.

General Considerations

Dr. Goldman said that there were three main indications for blood transfusion: to replace blood loss, to combat surgical shock, and to help the bactericidal properties of the blood. Blood could be given by direct or indirect methods. The former was more rapid but more difficult; the latter, using coagulants (citrate), had many advantages—blood could be given slowly and the patient could be at a distance from the donor. The disadvantage was that the blood was modified. Efforts to find whole-blood substitutes has not been entirely successful. Three were of interest: (1) 5 per cent. haemoglobin Ringer solution—no proof of good effects; (2) human serum—better than gum saline and easy to get (the disadvantage was the necessity for laboratory procedures); (3) pooled plasma—probably the best of the three. For straight erythrocyte deficiency there was nothing like whole blood, but for shock other methods were valuable; in these cases the aim was to increase blood volume to normal and not to increase the number of red cells. Plasma was obtained aseptically from blood by standing it twenty-four hours or by centrifuge, and kept in a sterile bottle with an equal volume of saline. It could be evaporated *in vacuo* to a dry powder and reconstituted as required by the addition of distilled water. It could be stored much longer than blood, did not need to be typed nor to be kept in a refrigerator. It could be given intramuscularly as well as intravenously. Efforts had been made to use modified whole blood. Cadaver blood, taken several hours after death from non-transmissible disease, had aesthetic objections; in placental blood there was a large reservoir of supply and it had a high content of bilirubin, potassium, calcium, and copper, but the technique was difficult. Heparin had the advantage of being a very active natural coagulant but was expensive. Transfusion with heparin could be performed: (1) "*in vivo*," giving 1 mg. per kilo to the donor and bleeding eight minutes later—the coagulation time was increased eight to ten times and the blood remained fluid for sixty to ninety minutes; (2) "*in vitro*"—heparin replacing citrate. It was found that 1,000 units of heparin kept 100 c.cm. of blood fluid for one to two hours. It had few advantages over citrate; within an hour leucocyte and platelet agglutination was occurring.

At present the best method appeared to be to use a citrate dextrose anticoagulant, keeping the blood aseptically at 2° to 6° C., and warming at least to room temperature before giving it. It was available for immediate use at any time or place. Stored blood gradually deteriorated on keeping. Up to seventy-two hours the technique of giving stored blood was as simple as giving fresh blood; after this time a gelatinous clot appeared which blocked tubing and needles. After ten days most bloods would block the tubes and needed rigorous filtration. On storing dextrose citrate, haemolysis began within three days, leucocytes began to degenerate within twelve hours, and platelets were agglutinated within twenty-four hours. The rate of erythrocyte destruction was retarded by a positive oxygen tension and hastened by trauma or a temperature over 8° C. Other changes that occurred were a diffusion of potassium into the plasma and a loss of complement. Stored blood had a definite part to play up to five days; after this time it was better for the plasma to be taken off and used alone. Whole blood could not be replaced altogether and stored blood became more artificial each day it was kept.

Death from Blood Transfusion

Professor S. L. BAKER discussed the pathology of death from blood transfusion. It might occur within a few minutes or hours, or after some days. The causes of rapid deaths were usually difficult to separate from the primary condition for which the transfusion was given. The intravascular

haemolysis of incompatible or damaged blood cells produced immediate ill effects, the patient becoming distressed, with a rise of temperature and lumbar pain. Exactly how these effects were produced was uncertain. A patient who was in a precarious state might die as a result of them, however. Or he might survive this stage but die later from renal failure. In that event there was suppression of urine with progressive nitrogen retention. Urine passed during the twenty-four hours after the transfusion contained dark brown blood pigment. These delayed deaths were from renal tubule blockage by blood pigment precipitated during the excretion of haemoglobin. This lesion of the kidney (haemoglobin infarction) had been known for a long time, particularly in blackwater fever, where a uraemic death might be caused by it. The mechanism by which this precipitate was produced was first elucidated by Dodds and himself in 1925. Haemoglobin, being of lower molecular weight than the serum proteins, was excreted by the glomeruli when its concentration in the plasma reached about 0.3 gramme per 100 c.cm. Rapid haemolysis of about 1/40th of the total corpuscles of the haemoglobin derived from 50 to 100 c.cm. of blood would give this threshold value. The haemoglobin was excreted in solution in the glomerular filtrate, but this became concentrated in its passage through the renal tubules. If the salt concentration exceeded about 1 per cent. of NaCl with a *p*H of 6 or less, haemoglobin was precipitated as a granular deposit of haematin. These conditions occurred in the renal tubules during the excretion of an acid-concentrated urine, and the precipitate might block the tubules. If the urine was not acid no precipitate formed and the kidneys escaped damage. The reaction was quantitative, and if the precipitate was not too massive the kidney could expel it, as could be proved by the appearance of brown granular casts in the urine. In the presence of haemoglobinuria a markedly acid urine was "blackwater," while a neutral or alkaline one was red. Intravascular haemolysis might result from incompatible or damaged red cells. Red cells became more fragile the longer they were stored. Fragile red cells were liable to rapid haemolysis in the circulation, and blood stored too long contained both free haemoglobin and fragile red cells. Practical suggestions made by Professor Baker were: (1) Keep the urine alkaline during and for twenty-four hours after transfusion; examine it several times for haemoglobin after transfusion and watch closely the urinary excretion. (2) The use of stored plasma should be further examined; it would be as good as blood in probably 75 per cent. of cases where shock was the main feature, and appeared to be free from many of the risks of whole blood.

The Value of Plasma

Professor MAITLAND agreed with Professor Baker about the great value of plasma. It would keep for years when dried and sealed *in vacuo*; it could be collected in large amounts and reconstituted as needed with distilled water. It could also be filtered bacteriologically and its sterility guaranteed before drying, and this could not be done with whole blood. There seemed to be an important future for plasma transfusion. Dr. G. S. SMITH instanced a case of lipoid nephrosis in which the oedema settled after a transfusion of plasma with saline, and did not recur. He described cases which suggested that apparently normal stored blood at times was not satisfactory, and that stored blood should not be used for transfusion in blood diseases. Mr. WILSON HEY said that for shock or haemorrhage plasma did not appear to have advantages clinically over glucose saline, and was liable to cause a greater rise in temperature and pulse rate. Dr. M. C. G. ISRAËLS agreed as to the value of plasma. In most cases in which only one transfusion was required the erythrocyte-forming tissue was in a normal state, and plasma plus iron should give a rapid response. In cases of blood diseases stored blood should not be given except when the marrow was normal.

Mr. D. LLOYD GRIFFITHS asked why it was unnecessary to group the plasma in view of the fallacy of the "universal donor" theory. Dr. GOLDMAN, in reply, said that this theory was not really a fallacy, and where tragedies had occurred after the use of Group O universal donors it was because these had in reality not Group O but weak Group A.

Correspondence

Hospitals requiring Blood Donors

SIR,—The four London Blood Transfusion Depots established by the Medical Research Council receive daily inquiries from blood donors who are leaving the depot district, and who are anxious to offer their services to some hospital near their new address.

At the moment no list of hospitals which run transfusion depots is available, and the good will of possible donors is therefore lost. If any hospital or doctor responsible for such a depot will send name and address to Dr. Janet Vaughan, Emergency Transfusion Service, Social Centre, Slough, it would be possible to make a list of hospitals requiring blood donors: this would then be available for reference and a satisfactory transference could be arranged. Dr. Vaughan will supply such a list on demand to any medical officer who would like to have one.—We are, etc.,

H. F. BREWER,
M. MAIZELS,
J. O. OLIVER,
J. M. VAUGHAN.

Slough, May 11.

Treatment of War Hysteria

SIR,—Although I hesitate to criticize a method of treating war neuroses which has given such excellent results as those described by Dr. P. L. Backus in his letter (May 11, p. 788), it seems necessary to do so in the light of experience gained in the last war. During the first eighteen months in which I was engaged in treating soldiers suffering from functional nervous disorders I was as enthusiastic as Dr. Backus about the value of hypnosis. After a time, however, I found, first, that we were able to get equally good results with simple explanation, persuasion, and re-education without hypnosis and with no deliberate suggestion of any kind, and, secondly, that the most severe cases of hysteria reaching England were those which had undergone hypnotic treatment in France. I saw mass hypnosis practised in Malta, and although I was told of the remarkable results obtained by this means it appeared to me then, and I still think, that such a method must render the patients quite abnormally suggestible. When it is remembered that the actual hysterical symptoms are the results of suggestion, it is clearly desirable to reduce rather than to exaggerate the suggestibility of the patients.

Lastly, war neuroses should be recognized and treated in the earliest stages before they are fully established. This can be done by regimental medical officers and in field ambulances and casualty clearing stations. Simple methods, such as those which were found so effective in the last war, can be practised by men who have had no previous experience in psychotherapy, whereas the methods advocated by Dr. Backus require the services of experts who are comparatively few in number.—I am, etc.,

Oxford, May 12. ARTHUR F. HURST.

Chemotherapy of Cerebrospinal Fever

SIR,—The communication on the incidence and control of cerebrospinal fever by Dr. E. Ashworth Underwood (*British Medical Journal*, May 11, p. 757) deals in some detail with the results following the exhibition of sulphonamide drugs in the treatment of this infection. The occurrence of the disease among the military community in the different Home Commands has provided opportunity for extensive observations on the results of chemotherapy.

In January last a War Office memorandum on this subject was circulated, suggesting the lines on which these drugs should be administered. This was followed later by a second memorandum (*Journal*, March 23, p. 498) dealing with the use of sulphapyridine soluble in the treatment of fulminating cases and of cases in which the diagnosis had been delayed. In a series of 900 cases in which the treatment outlined in

these memoranda has been followed the mortality has been between 6 and 7 per cent. It is to be noted that these results have followed the use of chemotherapeutic drugs alone. Serum was not administered.—I am, etc.,

H. MARRIAN PERRY,
Major-General; Director of Pathology.

The War Office, London, S.W., May 10.

Abduction Supports for the Humerus

SIR,—The recent articles on the so-called aeroplane splint and plaster fixation for the treatment of fractures of the upper part of the humerus have not, with one exception, drawn attention to the question of the prolongation of the thoracic portion of the apparatus downwards over the iliac crest. When this splint was introduced in Salonika about 1916, largely through the teaching of Colonel (now Sir Robert) Kelly and Major K. W. Monsarratt, if I remember rightly, we began by making patterns with the aluminium strip provided in the Army equipment. When trying these patterns on ourselves and on patients we found that there was much discomfort from the contralateral muscular strain, especially in the neck. This strain was engendered by the tendency of the spine to become concave and to rotate, which was in turn caused by the weight of the limb and splint which the ribs had to support. When the support was extended over the iliac crest the strains were, as might have been expected, very much relieved.

It seems to me that this is the most important point, next to the aligning of the bony fragments, to be observed. The wearing of the splint is irksome even in cool weather, and in warm weather is apt to be so tiring that the benefit derived from being up and about may largely be neutralized. The aluminium frames were produced very easily once the pattern was made. They were light, rigid, and well ventilated when secured by webbing and buckles. I had no experience of a plaster fixation of this nature, but I should think it would be very hot and unpleasant for the patient. It seems to me, therefore, that the necessity or otherwise for the downward prolongation referred to should be decisively settled before anything approaching mass production is put in hand for teaching this valuable method of treatment.—I am, etc.,

London, W.1, May 10. G. H. COLT.

Thomas Splint in First Aid

SIR,—May I endorse Mr. G. G. Alderson's remarks (May 11, p. 789) on the use of the Thomas splint by first-aid parties. All personnel at my first-aid post have had practical instruction in the use of this splint and should be competent to instruct volunteers. Their average time for its application is under five minutes, and on more than one occasion I have seen this splint efficiently and carefully applied in three minutes in a room lighted only by hurricane lamps.

In the event of the casualty clearing hospitals being strained to full capacity by large-scale raids, fractures satisfactorily immobilized by this very efficient method could be evacuated direct to base hospitals without further interference, with consequent benefit to both the casualties and the casualty clearing hospitals. In accounts of the Clacton explosion the necessity for non-concentration of the essential A.R.P. services is brought forcibly to mind; had the crash occurred in Old Road the excellent work of the various services would have been very seriously curtailed.—I am, etc.,

E. JOAN TODD-WHITE,
M.O., Fairlop First-aid Post.

Ilford, May 12.

Feigned Epilepsy in Wartime

SIR,—In the interesting and instructive article by Dr. Redvers Ironside (April 27, p. 703) mention is made of the difficulty in making a positive diagnosis of epilepsy during the interparoxysmal periods when there are no pathognomonic signs and symptoms, and it is emphasized that the distinction between true epilepsy and either a hysterical fit or that of a malingerer must remain in doubt until the direct clinical observation of the fit. This may necessitate a lengthy period of close observation, and I would like to draw attention to the possible aids to diagnosis afforded by methods which aim to produce in the patient conditions favourable for the occurrence of a fit.

It has long been known, for example, that in a true epileptic a fit can usually be provoked within forty-eight hours by the administration of quantities of water and injections of pitressin, a method which A. W. Jacobsen (*N.Y. State J. Med.*, 1934, **34**, 506) suggested might be used to establish a diagnosis of epilepsy in the shortest possible time. In a paper by Dr. J. L. Clegg and myself (*Lancet*, 1935, **1**, 1381) we recorded the results of this test on sixteen epileptics in whom fits only occurred at long intervals. A successful result was obtained in twelve patients, including three with a history of only three fits per year. It failed in two cases whose fits occurred only in two and ten years respectively. The test was negative in seven non-epileptic controls. It would therefore appear to be of some value in doubtful cases, although, in exactly its present form, there is a natural reluctance to make practical use of it. Perhaps further research along these lines would lead to some modification which will form a basis for an acceptable diagnostic test.—I am, etc.,

Sheffield, 6, May 7. F. T. THORPE.

The Intervertebral Disk

SIR,—In an article entitled "Retropulsion of the Nucleus Pulposus: A Critical Review," published in the *Journal* of November 25, 1939 (p. 1038), Mr. Sidney Pappworth by means of interrogations and innuendoes attacks the whole concept of the intervertebral disk as a causative factor in producing sciatica. Also by his analysis of various papers[1-7] he casts aspersions on the veracity of the various authors, including the writers of this note. His article already has been ably answered in the columns of the *British Medical Journal* by Mr. E. Peter Allen (December 9, 1939, p. 1159) and by Mr. J. E. A. O'Connell[1] (ibid., p. 1160). We give our hearty thanks to these gentlemen for their letters. It is a pleasure to know that our efforts are appreciated by some of our readers. Nevertheless we desire personally to answer some of Mr. Pappworth's questions and to draw attention to certain errors in his conclusions.

In the first place, is there such an entity as posterior protrusion of the intervertebral disk? As we have pointed out, there have been a good many reports of large traumatic posterior protrusions which have caused paraplegia. Kocher's[8] case reported in 1896 is the earliest one with which we are familiar. We should like to mention also the reports of Oppenheim and Krause,[9] Middleton and Teacher,[10] Dandy,[11] etc. Three of our cases fall into this group. But the important and debated point is this: Do posterior protrusions occur in the lumbar region that cause symptoms by direct pressure on nerve roots without causing paraplegia, a symptom-complex in no way distinguishable from so-called "sciatic scoliosis," etc.? We believe that such lesions do occur and that a review of the recent literature will show agreement by a very considerable number of surgeons widely distributed, in this country at least. This lesion has been seen and described too often and the results of operation are too satisfactory for it to be an incidental finding in an ill-advised exploratory operation. We should refer the reader to Saunders and Inman's[12] critical review of the literature pertaining to the intervertebral disk.

Mr. Pappworth points out what appear to be glaring errors. He remarks sarcastically, "One is tempted to ask Professor Barr his method for the resurrection of the dead"—not very courteous language to use in criticizing the work of another surgeon. This remark is called forth because in two papers[1,2] three deaths were reported, while in a third paper[3] only two were reported. It is stated clearly in the two earlier papers, thought not in the title, that the lesions reported occurred anywhere in the spinal column. One death occurred in a case of protrusion of the fifth cervical disk. Death was due to paraplegia which did not clear up following operation. The third paper[3] is entitled "'Sciatica' caused by Intervertebral Disk Lesions: A Report of Forty Cases of Rupture of the Intervertebral Disk occurring in the Low Lumbar Spine and Causing Pressure on the Cauda Equina." Naturally, no case of cervical or dorsal protrusion, whether a success or a failure, whether

alive or dead, was included in this paper. We believe that most of the apparent discrepancies picked up by Mr. Pappworth are due to his oversight of this carefully stated fact—namely, that the statistical tables in these papers did not refer to the same group of cases.

A number of Mr. Pappworth's criticisms insinuate amateurish neurological observations and conclusions. He is astonished that individual root compression of different root components of the sciatic nerve should give similar referred pain. Why not? He is surprised that a cervical disk hernia can simulate the symptomatology of cord tumour, multiple sclerosis, and syringomyelia. It can do so.

We have analysed and re-analysed this group of cases, and we have done so honestly and carefully. We have changed some of our tentative opinions as we have gained in experience, and have stated these changes as they appeared. We feel that this lesion is only one of many causes of sciatica, and we do not advocate investigation of the spinal canal in mild or early cases. On the contrary, we have always stated that investigation and operation should be reserved for those cases which are not relieved by prolonged conservative treatment, and then only after certain other criteria were fulfilled.

Instead of calling for "a close season for the writing of articles" we feel that a subject like this, in which a clinical syndrome can be recognized and effective treatment applied, demands wide-spread attention.

If Mr. Pappworth will give the same amount of study in analysing his own cases of sciatica that he has given to destructive criticism of our papers we are quite certain he will find a number of patients who will fall into the group under discussion and who will praise him if he relieves them of intractable sciatica.—We are, etc.,

WILLIAM JASON MIXTER, M.D.
JAMES B. AYER, M.D.
Boston, Mass., April 26. JOSEPH S. BARR, M.D.

REFERENCES

1 Mixter, William Jason, and Barr, Joseph S. (1934). *New Engl. J. Med.*, **211**, 210.
2 —— and Ayer, James B. (1935). Ibid., **213**, 385.
3 Barr, Joseph S. (1937). *J. Bone Jt. Surg.*, **19**, 323.
4 —— Hampton, A. O., and Mixter, W. J. (1937). *J. Amer. med. Ass.*, **109**, 1265.
5 Mixter, William Jason (1937). *Ann. Surg.*, **106**, 777.
6 Barr, Joseph S. (1938). *British Medical Journal*, **2**, 1247.
7 Love, J. Grafton, and Camp, John D. (1937). *J. Bone Jt. Surg.*, **19**, 776.
8 Kocher, T. (1896). *Mitt. Grenzgeb. Med. Chir.*, **1**, 415.
9 Oppenheim and Krause (1909). *Dtsch. med. Wschr.*, **35**, 697.
10 Middleton, G. S., and Teacher, J. H. (1911). *Glasg. med. J.*, **76**, 1.
11 Dandy, W. E. (1929). *Arch. Surg.*, **19**, 660.
12 Saunders, J. B. de C. M., and Inman, W. T. (1939). *Int. Abstr. Surg.*, p. 14 (*Surg. Gynec. Obstet.*, 1939, **59**, 1).

What is Influenza?

SIR,—It is time that we, as a profession, ceased to use the term "influenza" in the loose way at present so commonly indulged in. This diagnosis should never be given unless the following three symptoms are definitely present: (1) very sudden onset; (2) severe pain in the head and back; (3) great depression. To talk of "waves of influenza sweeping the country," as has been the habit in epidemics of ordinary infectious colds during the past few years, renders our profession ridiculous. I am not now concerned with the actual cause of the disease, but I wish to emphasize the fact that it is really not nearly so common now as it was in the beginning of the century. Moreover, infection of lower animals with nasopharyngeal washings can never be accepted as reliable evidence in any case; nor will the spraying of rooms and improved housing conditions make any difference in the spread of such infections, which are as prevalent in the homes of the wealthy as in those of the poorer classes.

In my experience of forty years I am inclined to believe that genuine influenza is more and more apt to recur the more often a patient is attacked, but, as in malaria, immunity becomes established after a varying period of years. In conclusion, I do wish that the term "influenza" would cease to be applied save to cases which fulfil the three clinical criteria set out above, and that the silly word "'flu" be dropped altogether.—I am, etc.,

Edinburgh, May 4. JAMES BURNET, M.D., F.R.C.P.Ed.

SIR,—In support of Dr. Lees Templeton's statement (May 4, p. 743) that "the clinical entity generally recognized as influenza has not yet been shown to be due to any one organism or virus," and perhaps to support the theory of "two distinct epidemics clinically inseparable," may I add my small experience.

In a recent epidemic in a school of about one hundred people, all equally exposed to infection, I had thirty-six cases, all clinically inseparable and all mild. Twenty-two of these had, however, a leucopenia of 3,000 to 6,000 cells per c.mm.; fourteen had a leucocytosis of 12,000 to 20,000. One returned to school after recovery from the former type to return in a few days to the sanatorium with a "relapse," but with leucocytosis and another spell of ten days' illness. I have had similar experiences before during the last year or two, whereas previously I had almost invariably found a leucopenia. I have had to isolate the patient according to the leucocyte findings. Those with a count of more than 14,000 were thought to be probably streptococcal and were given sulphapyridine.—I am, etc.,

Battle, Sussex, May 7. H. ANGELL LANE.

Rubella and Polyarthritis

SIR,—A number of your correspondents have been interested in what they describe as neuritis following rubella. Dr. G. M. W. Hodges (March 30, p. 548) quotes four cases in which the pain and loss of power occurred chiefly in the wrists and hands. Dr. Beryl Harrison (April 13, p. 637) quotes her own attack with swelling of the wrists and ankles, and another in which there was pain in the forearm and shoulder and intercostal regions, and numbness and loss of power in both wrists and hands. Dr. Alistair French (May 11, p. 791) suggests that the "neuritis" may actually be acute or subacute rheumatism associated with a streptococcal lesion, misdiagnosed as rubella. In the *Lancet* (1940, **1**, 607) Dr. Suffern quotes a case in which there was pain and swelling in the knees and mid-tarsal joints followed later by the wrists and finger-joints. There was weakness and "pins and needles" in the affected areas. In the same issue (p. 606) an annotation in that journal referred to Dr. Suffern's letter as relating to a "much rarer sequel, toxic polyarthritis." Of the textbooks, Osler (ninth edition) mentions arthritis as a complication, whilst Price (fifth edition, 1937) only mentions rheumatic pains of a mild type.

It may therefore be of interest to record the frequency of this symptom in the present epidemic. Out of seventy-two patients suffering from typical rubella and seen consecutively twenty-five suffered from polyarthritis. It is impossible to discuss here the pathology, and polyarthritis must be taken as a convenient descriptive name. The condition resembled a mild rheumatic fever usually passing from one joint to another, causing pain, swelling, heat, very occasionally redness, and loss of power in the affected joints. The youngest patient with polyarthritis was 8 years old, and the oldest was 82. All these patients had enlarged posterior cervical and occipital glands. None had received sulphanilamide treatment.—I am, etc.,

Beaminster, Dorset, May 12. R. E. HOPE SIMPSON.

Neuritis following Rubella

SIR,—Since writing my original letter describing four cases of neuritis following rubella (March 30, p. 548) I have had a further eleven cases and my colleague (Dr. H. R. W. Franklin) one case. I cannot agree with Dr. Alistair French (May 11, p. 791) that any of these were "mild scarlet fever"—that is, a haemolytic streptococcal infection of the throat in a patient susceptible to that particular haemolysis. All my patients presented a typical rash, commencing on the side of the face, spreading on to the forehead and down the neck, and appearing a few hours later on the forearms and legs. They also had palatal rashes (but no Koplik spots) without marked faucial engorgement. Enlarged posterior cervical glands were present in every case. None showed the relatively high pulse-temperature ratio of scarlet fever. None had

subsequent albuminuria, and such swelling of the hands as occurred was general and not confined to the joints. Also none were given drugs of the sulphonamide group.

I am inclined to think (and to this extent I agree with Dr. French) that we have been dealing with a mixed infection, probably streptococcal but non-haemolytic. Since writing my first letter I have heard that in the Cambridge Pathological Laboratory a streptococcus has been grown in large numbers from every case of rubella examined.—I am, etc.,

G. M. W. HODGES, M.B., B.S.Lond.

Deddington, Oxon, May 11.

SIR,—I have recently seen in my practice three cases of brachial neuritis following typical attacks of rubella in adults. None of these cases had been treated with any of the sulphonamide drugs. This complication is not mentioned in the *British Encyclopaedia of Medical Practice*. I said to one of these patients that this complication was not given by the authorities, and was crestfallen when she told me that it was described as a complication of rubella in her household book of herbal remedies.—I am, etc.,

E. W. WITNEY.

Tankerton, Kent, May 12.

Treatment of Acute Bacillary Dysentery

SIR,—In a discussion on acute bacillary dysentery which took place in the Royal Society of Tropical Medicine and Hygiene on March 28, and which was reported in the *British Medical Journal* of April 27 (p. 706), I was sorry to see no mention made of Turkey rhubarb root powder as a treatment. Anyone who has used this simple drug would never use anything else; he would never bother about antisera. At a time like the present this should be made very plain, and it should be written very dogmatically.

In treatment it matters nothing what the bacilli present are: laboratory reports may say Shiga or Flexner, or unnamed groups. The dose is a teaspoonful (not by measure) every hour until the rhubarb appears in the stools. Afterwards it may be given for a few days less frequently. The powder can be wetted and made into little balls or lumps and then swallowed off with water. Rhubarb powder apparently acts indirectly by promoting an enormous excretion of light-yellow-coloured bile (and perhaps in addition intestinal secretions); it evidently does not act directly on the bacilli, as rhubarb *in vitro* has, I understand, no effect on them.

As soon as the rhubarb appears in the stools, giving a reddish colour like blood, the acute signs and symptoms begin to be modified. On going into the room one notices that the gangrenous smell has gone; the tenderness and rigidity of the abdominal wall are markedly less; there is no pain; the hollow face, the shrunken eyes, the dry mouth and tongue, the running pulse, the temperature are all much better. I need not go into detail, but the difference in another few hours is wonderful; one could not believe the improvement apart from seeing it.

Acute bacillary dysentery can be a terrible disease. In Nairobi from 1911 to 1917 I never saved a case in any race. From 1917, when I began to use rhubarb, to a couple of years ago, when I left East Africa, I never lost a case in either adult or child. The treatment of acute bacillary dysentery by rhubarb was first brought to my notice by a letter in a medical paper from a medical officer in Salonika, in which he said he prescribed the tincture of rhubarb with great success. On reading this I at once started by trying the powder, and very soon got to use it in the above-mentioned doses. I can remember getting the medical officers of a big native military hospital of some 1,500 beds, to which I was attached for surgical work, to adopt this treatment: the death rate there from dysentery at once fell from thirty a day to three a day.—I am, etc.,

R. W. BURKITT, F.R.C.S.I.

Ballycastle, Co. Antrim, May 7.

Prevention of Throat Infection

SIR,—Drs. Helen P. Goodrich and G. L. Way (May 11, p. 768), who discuss the value of such common practices as the use of the gargle and throat paint, are serving a useful purpose. To wash and to moisten the surfaces of the mouth and tonsils and to stimulate the gland secretions must help in health, as it does in severe illness, to prevent infection. It is, however, interesting to examine the throat of a patient who has just gargled with a solution containing a dye so that the small area affected may be seen. Some sore throats follow an initial nasal infection, and an extreme example is seen in the tonsillitis which occurs when a gauze pack is left too long a time in the nose after submucous resection of the nasal septum.

I am increasingly often asked to treat nurses who are carrying certain haemolytic streptococci and who are considered unsafe to work in obstetric wards. Gargles and throat paints as a rule fail to remove these organisms, and when the patient has not had sore throats and feels well the effect of diathermy (multiple-point coagulation deeply into and around the tonsil crypts) under "local" surface anaesthesia has been tried with poor results. Tonsillectomy often does what is required, and it may be that in some of the cases in which it fails the nose and sinuses are at fault.—I am, etc.,

W. BRYCE MCKELVIE.

Manchester, May 11.

Safe Obstetrics

SIR,—I was interested to read Dr. Griffith Evans's note on safe obstetrics (April 13, p. 635) and the extraordinarily good figures shown by the Croydon County Borough. I am a medical officer of a small public assistance hospital (formerly Poor Law) at Carnarvon. It was with some interest that I reviewed the maternity admissions to this, the Eryri, Hospital during the last ten years—namely, January, 1930, to January, 1940. I find that during this period, admitting the poorest type of patient from the point of view of nutrition, including many "emergencies" who had to travel in some instances many miles, 179 cases in all were admitted. Of this number thirteen were cases of Caesarean section, seven were cases of eclampsia, and eighteen were forceps deliveries and included two craniotomies. Only two of the cases of Caesarean section could be classed as booked; they were being operated on for the second time. None of the other eleven was sent in or seen by me before admission. The seven cases of eclampsia were only noted as such if fits were actually witnessed in hospital.

On this basis it is difficult to estimate what total of normal cases this number of 179 represents, but a conservative estimate suggests at least a thousand. In this sequence of ten years there were eighteen stillbirths; of this total five births were premature; five other foetuses were macerated, and eight were full-time; out of the total birth of 183 representing four sets of twins. There was no maternal death.

The nursing in this hospital, particularly of maternity cases, has been excellent. Apart from great cleanliness the only outstanding precaution taken was, in the earlier years, the administration as a routine of a dose of anti-puerperal serum to practically all forceps cases, cases that had been frequently examined or that appeared to show any signs of sepsis, and, in later years for the same reasons, the administration of prontosil (or its substitutes) instead of the serum.—I am etc.,

W. HILTON PARRY, M.O. i/c Eryri Hospital, Carnarvon.

May 3.

The Occipito-posterior Position

SIR,—I have recently read the communications regarding the above in your columns and I was surprised to see no mention of Kielland's forceps. I have recently acquired a pair of these and have now used them on three posterior presentations with very pleasing results, the occiput rotating to the front on every occasion. The amount of traction required appears definitely to be less than that required with other types, and the absence of a rigid locking device would appear to reduce to a minimum the pressure on the foetal head. I did not find the forceps difficult to apply, and consequently am greatly encouraged to continue with them.—I am, etc.,

G. NICHOLSON.

Tiverton, May 7.

SIR,—Dr. E. F. Pratt's letter (May 4, p. 746) is of very great interest, backed as it is by such a wide experience. I, with but a few years of practice behind me, have been asking

myself the question: "How early should one interfere in a persistent O.-P. case?" I remember a "rule" of student days which said: "If the second stage has lasted more than two hours, seek the reason why and interfere if necessary." It is possible that this outlook might lead to a delay of two hours in the diagnosis of occipito-posterior positions. No one would encourage frequent vaginal examinations, but I am becoming more and more convinced that what Dr. Pratt so admirably expresses is right—that is, it is wrong to wait if there is a possibility of the position being occipito-posterior.

I have recently delivered a case of the same type as Dr. Pratt's. A woman in her third confinement (having previously had two easy labours of three or four hours' duration) was approaching full dilatation after a labour of about eighteen hours. Her pains were most severe in the back and were short. These factors, together with abdominal palpation, prompted me to make an examination under anaesthesia at the beginning of the second stage. I found a persistent occipito-posterior position and was able to turn the occiput with ease bimanually. I then withdrew my hand and the foetus was easily delivered in five good pains.

If it is possible to proceed on these lines I believe that it is of benefit to the mother and infant. There are those who object to interference of this sort at the beginning of the second stage. In a multipara I cannot support this objection because the normal second stage may occupy only a few minutes. I am more and more impressed by the diagnostic significance of pain in the back in occipito-posterior positions becoming more pronounced as labour proceeds.—I am, etc.,

Beer, Devon, May 7. S. J. HADFIELD.

Medical Treatment for Hepatic Cirrhosis

SIR,—Professor G. Grey Turner's letter on long survival after omentopexy (May 4, p. 745) has prompted me to describe the following technique for dealing with ascites of similar origin—that is, due to pure hepatic cirrhosis and portal obstruction. If the intra-abdominal fluid tension is high, enough fluid is removed to take off any considerable strain. Then a saturated solution of ammonium chloride is injected into the peritoneal cavity sufficient to make approximately a 1 per cent. solution of ammonium chloride. In most cases this can be done with a 20-c.cm. syringe. The plunger is drawn back and pushed forward several times to ensure a rapid diffusion of the salt. Care must be taken to avoid leaving ammonium chloride along the needle track, otherwise a sinus may ensue.

This injection is repeated every second day, and with the fourth injection 2 c.cm. salyrgan is given intravenously. The patient is then rested for two to four days, according to his condition. The course is then repeated, up to six times if necessary, though usually three to four courses are sufficient.

This procedure appears to me to be a medical equivalent of the Drummond-Morison operation, and seems to re-educate the peritoneum, presumably by irritation, causing opening up of systemic veins. The technique was suggested to me by Dr. Gordon Ryrie of the Sungei Buloh Leprosy Settlement, F.M.S. He has used it with marked success in the ascites due to the cirrhosis which occurs in long-standing leprosy. I have been unable to try it out on a patient suffering from alcoholic cirrhosis, but see no reason why it should not work just as well as in the cases of leprotic cirrhosis.—I am, etc.,

Newcastle-upon-Tyne, May 6. J. P. SPARKS, jun.

Chloroform in Medicines

SIR,—I am writing to inquire about the scientific or aesthetic rationale underlying the administration of chloroform for its internal action other than that of anaesthesia. Gallons of chloroform are dispensed by chemists to patients every year under doctor's orders in the form of chlorodyne or tinct. chlor. et morph. co., etc., and it has frequently occurred to me that such practice might be terminated with much advantage to the patient. So many unfortunate Lancashire livers have a routine task of detoxicating the ordinary daily meal of suet dumplings, pork pies, black puddings—and aspirins—that they cannot relish the additional four-hourly burden of detoxicating the chloroform prescribed by doctors. Can it be that the alleged beneficent carminative value of chloroform is supposed to outweigh its very definite, scientifically proven, toxic trauma?

It is perhaps time for the medical profession to ask themselves, and others, some awkward questions about preventive medicine and modern therapy, such as: Should a tissue poison drug be given if its ultimate toxic action is likely to be more injurious to the patient than its immediate temporary action is proving advantageous? This is not a trifling consideration, but one which involves the health of the community and the very foundations of our work.—I am, etc.,

Kearsley, May 11. D. OCKMAN.

Axillary Thrombosis

SIR,—Reading the annotation on axillary thrombosis (December 30, 1939, p. 1283), and also on account of the rarity of the condition, I am prompted to quote a case seen by me a little over a year ago. While on the voyage to England I was consulted by one of the apprentices, a lad about 20, who showed me a swollen left arm, which had come on within twenty-four hours. It was painless and he was in excellent health. There was nothing to be felt in the axilla, so the obstructing agent was in the subclavian vein. Never having seen a spontaneous thrombosis in this position, I at first thought that he might have some rapidly growing mediastinal tumour. Examination failed to reveal anything of that nature, so the choice remained between thrombosis or external pressure. As we were within a day or so of Capetown, it was thought best to leave him there for an *x*-ray examination. I met one of the leading surgeons there in consultation, and he agreed that it would be the best thing to do. Later on I heard that no tumour had been found at *x*-ray examination, and a few weeks later he was returned home to England. I saw his father later on, who told me that the swelling gradually subsided.

While in Edinburgh I happened to mention the case to Sir John Fraser in the Edinburgh Infirmary, and he told me that he had seen one or two similar cases and that they were usually found in healthy young men, and suggested that the thrombosis was due to some developmental fibrous bands which pass under the subclavian vein. I will write asking him to confirm this view, as such a view is not expressed in the article you publish.

Ballarat, Victoria, March 26. SYDNEY PERN, M.R.C.S.

Tetanus Prophylactic Toxoid: A Personal Experience

SIR,—An interesting experience following an injection of the tetanus prophylactic toxoid has befallen me. Whether a previous injection of A.T.S. had anything to do with it I feel unable to explain out of my own scanty knowledge of the subject.

About four months ago I was given—by mistake—1 c.cm. of A.T.S. So far as I can remember I felt no reaction. On March 17, 1940, at about noon, having already that morning injected over a hundred men with toxoid, I gave myself 1 c.cm. (into the left rect. abdom.); I employed the same 10-c.cm. syringe and one of the same four needles I had used for the men; a score or so had already been injected out of the same bottle and I myself got the sixth (or seventh) dose of the last syringeful used that morning, the remainder being returned to the bottle. The rest of that bottle was used in the afternoon. I did not enjoy my afternoon tea and, contrary to the usual, ate very little at dinner; I went to bed early, feeling unduly tired. Not long after midnight, so far as I can judge it, I had severe cramps in both lower limbs and especially in the calf muscles: the back muscles, too, felt stiff, and particularly those of the neck. There was no headache and the mind was clear. The spasms of the muscles were evoked by the very slightest of movements. They were so unpleasant that I deemed it expedient to lie as immobile as I could. Within four hours they had ceased entirely. There followed an "attack" of flatulence and diarrhoea. The stools were frequent and entirely liquid, but they were not offensive and there was a complete absence of straining. I stayed in bed the whole of March 18. I did not desire, nor eat, any food until the next morning. There was a

considerable degree of thirst. I got up betimes and returned to duty on the 19th. Apart from feeling extraordinarily fatigued I felt quite well. The bowels remained on the loose side for another twenty-four hours. At no time was there any feeling of a raised temperature, and the tongue remained clean. By the morning of March 23 I was back in my normal excellent health.

Of the 500 officers and other ranks injected with the toxoid (within three days), only two got a reaction. I have described above my own reaction; the other had a mild herpetiform rash at the site of the injection, and this cleared up in less than seventy-two hours.—I am, etc.,

G. RALSTON,
Lieutenant, R.A.M.C.

B.E.F., March 24.

Patriotism and the R.M.B.F.

SIR,—The publicity so kindly given by the medical press to the needs of the Royal Medical Benevolent Fund has had an immediate result in the welcome gift from a medical man of a cheque for £100. The generous donor wishes the amount to be invested in Defence Bonds, and thus helps both his country and the Fund. A most praiseworthy example which it is hoped may be followed by others who are minded a double duty to perform. Smaller amounts (minimum £5) would be equally acceptable. The address of the Fund, on and after May 24, will be: 1, Balliol House, Manor Fields, Putney, London, S.W.15.—I am, etc.,

D'ARCY POWER,
Chairman of Committee of Management.

May 9.

Obituary

J. J. DAY, O.B.E., M.R.C.S., D.P.H.

By the death on April 13 of Dr. Day, medical officer of health for the borough of Sandwich and the rural districts of Dover and Eastry, the public health service in East Kent has been deprived of an experienced administrator, the citizens of Sandwich of their oldest medical practitioner, and his colleagues of a friend who never spared himself in their common team work and whose wide clinical knowledge of tropical diseases was always at their disposal.

James John Day was born at Port of Spain, Trinidad, in 1871. On the return of his family to England he was able to enter Middlesex Hospital as a medical student, and obtained the M.R.C.S., L.R.C.P. in 1896. Soon after qualification he practised at Deal for a time as assistant. This was followed by service in Africa, first as a district medical officer in the Niger Coast Protectorate and later on as a civil surgeon in the South African Field Force during the Boer War. On his return to England he was appointed an assistant medical officer on the staff of the Metropolitan Asylums Board, and took the D.P.H. in 1902. The next year found Day back in practice in East Kent at Sandwich. In 1909 he became the part-time school medical officer of Sandwich and Eastry. He joined the British Medical Association in 1911, and thereafter devoted more and more time to the many problems which arose under the National Health Insurance Act. The last war found him again attached to the R.A.M.C. as a civil practitioner, and in charge of many aspects of military hygiene at the "mystery port" of Richborough on the Stour. To one born in the Tropics, and trained in Nigeria in the control of *Anopheles maculipennis*, the prevention of indigenous malaria was an old and familiar problem. To his district during 1914–18 came patients from Salonika and other fronts to convalesce after malignant malaria. That he succeeded is shown by the decoration awarded to him. He was a member of the Kent Local Medical and Panel Committee from 1919 till 1935 and chairman from 1919 to 1927. He was the committee's representative on the Insurance Acts Committee of the B.M.A., and the county council appointed him as a member of the Kent Insurance Committee. In 1920 he was appointed the first whole-time medical officer of health of East Kent (No. 2) United District.

Dr. A. B. McMaster writes: When one came to live in Dover in 1920 and practise preventive medicine at the Gateway of England it was a privilege to find a distinguished colleague like Dr. Day one's opposite number in the surrounding rural districts. Our immediate point of contact and joint interest was the fact that we had been in general practice for years before joining the public health service. He was a happy, cheerful soul, with a great brain and logical mind, quick in everything he said or did. He had two hobbies—the one politics, the other medical politics as they affected panel practice. He gave much time to the chairmanship of the Sandwich Conservative Association and was a very ready speaker. His capacity as an organizer was used for the last time in the public health service in Kent when he was elected chairman of the Medical Committee to consider how best to bring to the notice of the public the advantages to be gained from the immunization of children against diphtheria. The variety of subjects and problems on which his advice was valued by the British Medical Association is shown by headquarters records extending from 1926 to 1936.

We regret to record the death at the age of 81 of Dr. WILLIAM BRADBROOKE, of Sutton Courtenay, near Abingdon. He was a learned archaeologist and genealogist who spent nearly fifty years in medical practice. Born at Bethnal Green on January 1, 1859, son of Thomas F. Bradbrooke, he was educated for the medical profession at the London Hospital, where he served as house-surgeon after qualifying M.R.C.S. and L.S.A.; then for three years he was senior resident surgeon at the Royal Sea-Bathing Hospital, Margate, and in 1887 began practice at Alcester. In 1895 he went to Fenny Stratford and was appointed surgeon to the London and North-Western Railway, and later consulting oculist to the Bucks Education Authority. During the last war he was medical officer to the R.E. Signals Depot at Fenny Stratford, and to the prisoners of war camp at Woburn. Dr. Bradbrooke was one of the five founders in 1911 of the Society of Genealogists and belonged to the Archaeological Societies of Bucks, Berks, Oxfordshire, and Oxford University. He visited many hundreds of churches, usually on a bicycle, studying church architecture and parish registers. He was deeply interested in the life of the country folk among whom he practised and whom he met on his antiquarian excursions. He had been a member of the British Medical Association for thirty years, serving for seven years in the Representative Body and holding the presidency of the South Midland Branch in 1925–6. Dr. Bradbrooke was the joint author of an article on Vital Statistics from Old Parish Registers published in our Nova et Vetera column last January.

Dr. GEORGE YOUNGER RICHARDSON, medical officer of health for the counties of Midlothian, West Lothian, and Peebles, died suddenly in Edinburgh on May 1 after more than twelve years in that post. He was educated at the Royal High School and the University of Edinburgh, graduating M.B., Ch.B. in 1906. After postgraduate study in London and Paris he took the M.D. degree at Edinburgh, his thesis being founded on the work of the first tuberculin dispensary in Scotland, with which he had been associated in Leith for two years. From Leith he went to Ayrshire, and then to Carlisle as assistant M.O.H., and during the war he served in France and Belgium with a temporary commission in the R.A.M.C. He was invalided home from Passchendaele in 1915. Dr. Richardson had been a member of the British Medical Association for twenty-nine years.

We regret to announce the death on April 18 of Dr. CECIL WHITEHALL COOKE of Hove, and formerly of Pinner Hill, Middlesex. The third son of the late Alfred C. Cooke, of Primrose Hill, he was born on May 18, 1864, and was educated at Merchant Taylors' School. He gained the Merchant Taylors' Scholarship in 1882 and proceeded to St. Thomas's Hospital, where he gained, in 1883, the first entrance scholarship in natural science. He took the M.R.C.S., L.R.C.P. diplomas in 1887, the M.B., B.S.Lond. degrees in 1889,

and in 1893 proceeded to the M.D. He was clinical assistant in the ear, nose, and throat department and afterwards house-physician to the late Dr. W. H. Stone. After leaving St. Thomas's, Dr. Cooke was assistant to the late Dr. Hatton at Newcastle-under-Lyme, Staffordshire, but left, and finally settled down at Willesden Green, N.W. He became Divisional Surgeon to the Metropolitan Police at Willesden Green, and later was appointed certifying factory surgeon for the Willesden and Hampstead districts, an office which he relinquished only at the beginning of 1938. He was for many years on the honorary staff at the Passmore Edwards Cottage Hospital, now the Willesden General Hospital.

The following well-known foreign medical men have died: Dr. BERNARD FANTUS, professor of pharmacology and therapeutics at the University of Illinois School of Medicine from 1903 to 1924, and since 1914 director of therapeutics at the Cook County Hospital, Chicago; Dr. G. G. PERRANDO, emeritus professor of legal medicine and insurance medicine at Genoa University; Dr. HANS VIRCHOW, professor of anatomy at Berlin University, aged 88; Professor ERNESTO LUGARO, director of the neuropsychiatric clinic of Turin University, aged 70; Professor AMATORE AUSTONI, senior surgeon to the civil hospital at Verona and one of the leading Italian surgeons; and Dr. MARCEL PINARD, director of the dermatological and venereological department of the Hôpital Cochin, Paris.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a Congregation on May 12 the degrees of M.B., B.Chir. were conferred (by proxy) on T. L. Oliver.

UNIVERSITY OF MANCHESTER

The honorary degree of LL.D. will be conferred upon Dr. Walter Elliot, F.R.S., F.R.C.P., on June 10, when he will open the Dental Hospital of Manchester and the Turner Dental School.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council, held on May 9, with the president, Mr. Hugh Lett, in the chair, Sir Percival Nicholls, Medical Director-General of the Navy, and Sir Richard Needham were admitted to the Fellowship.

The president was appointed, *ex officio*, a member of the Governing Body of the British Postgraduate Medical School for one year.

It was decided to recognize the schools attached to the Royal College of Surgeons in Ireland as places at which the course of study for the Primary Fellowship Examination of this College may be taken.

The City General Hospital, Sheffield, was recognized under paragraphs 21 and 23 of the Regulations for the Fellowship in respect of the posts of senior assistant in surgery and senior house-surgeon.

Diplomas of Membership were granted to A. Lang and F. Livesey and to the 205 candidates whose names were published in the report of the meeting of the Royal College of Physicians of London in the *Journal* of May 4 (p. 752).

A Diploma of Fellowship was granted to B. B. Bhatia.

Mr. E. B. Dowsett, M.R.C.S., L.D.S., left London on May 8 for Egypt to act as Visitor to the dental schools of the Fouad I University, Cairo, on behalf of the College.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

A quarterly meeting of the College was held on May 7, with the president, Dr. Alexander Goodall, in the chair. Dr. C. G. Magee (London), Professor F. A. E. Crew, F.R.S. (Edinburgh), Dr. A. J. Wilson (Coventry), and Dr. J. L. Henderson (Edinburgh) were introduced and took their seats as Fellows of the College. Dr. Joseph Primrose Leckie (Edinburgh), Dr. James Roberts Boyd (Wellington, N.Z.), Dr. Donald Stewart (Birmingham), Dr. John McMichael (London), Dr. Donald Marcus Fielding Batty (Edinburgh), and Dr. John Halliday Croom (Edinburgh) were elected Fellows of the College.

The Lister Fellowship was awarded to Lieutenant-Colonel W. Glen Liston.

Medical Notes in Parliament

Mr. Churchill has become Prime Minister and has formed a new Government in which Mr. Malcolm MacDonald is Minister of Health. The House of Commons met on May 13 and carried by 381 votes to 0 a resolution welcoming the formation of the Government and declaring the resolve of the nation to prosecute the war to a victorious conclusion. The House of Lords also sat. Both Houses adjourned till May 21.

Health of Factory Workers in Wartime

On May 9 Mr. RHYS DAVIES opened a debate on factory administration. He cited the report of the Industrial Health Research Board of the Medical Research Council, which declared that during the war of 1914–18 increase in the hours of labour did not induce proportionate increase of output. He wished to know whether the factory inspectorate was adequate for the increased number of persons employed in factories. He hoped that inspectors would see employers carried out the suggestions in the Home Office's recent pamphlet about the effects of the black-out on factory workers. Was the Home Office pressing not only for the establishment of safety committees in factories but for the appointment of welfare advisers?

Dr. SUMMERSKILL also referred to the report of the Industrial Health Research Board, which had said that accidents in factories were largely due to sickness and fatigue and that the basic problem was one of health in body and mind. Why did the State examine boys and girls under 16 before they went into a factory but not assume responsibility for the health of boys and girls over 16 or of men and women? Women were being recruited for war work who had never been insured under the National Health Insurance Act, and therefore had never had a medical examination. Dr. DAVID ADAMS said the high rate of tuberculosis on Tyneside was alleged to be due to low nutritional standards and to the overtime worked by women and girls in the factories there.

Mr. PEAKE said the admirable report of the Industrial Health Research Board was well known in the Ministry of Supply. He expounded the work of the Home Office and of the factory inspectors, mentioning that special safeguards for work in radio-active processes had been devised with the aid of the medical and engineering officers in the Factories Department. The pamphlet on the ventilation of factories under black-out conditions had produced good results. The Factory Lighting Committee had issued one report and had been asked to accelerate its activities. To enforce medical examination for entrants over 16 years into factories and industries would require legislation. A good deal had been done recently as regards the employment of whole-time doctors in the larger factories, especially factories established by the Ministry of Supply. The experience of the Home Office confirmed the observations on hours of work which had been quoted by Mr. Rhys Davies. In no case since the war had the Home Office permitted employment by night of girls under 18 or of boys under 16. Many orders authorizing overtime for young persons under 16 had not been renewed.

Colonel LLEWELLIN, in an answer to Mr. De la Bere on the same day, said appropriate local arrangements for medical services had been made at all Royal Ordnance Factories. These included the appointment, as and when necessary, of departmental medical officers working in close contact with the officers of the Home Office. Mr. Burgin was not satisfied that it was necessary to superimpose a central medical organization at the Ministry of Supply.

Protection of Practices Scheme.—On May 7 Mr. GROVES asked the Minister of Health whether he was aware of the uncertainty which existed among insurance practitioners by reason of the failure of the voluntary schemes for the protection of the medical practices of doctors who were whole-time on national work, including service with the Forces, and the amendment of the Allocation Scheme by some insurance committees under the

Medical Benefit Amendment Regulations (No. 4) of 1939, as two methods were operative in some areas; and whether he would consider a unified scheme. Dr. ELLIOT said he was aware that the protection of practices schemes applicable to neighbouring areas were not always uniform. The schemes were, however, promoted by mutual arrangement between the local representative bodies concerned, and he saw no sufficient reason for the imposition by himself of a unified scheme.

Notes in Brief

The standard of physical fitness of the candidates for pilot duties in the Royal Air Force remains satisfactory, and the high medical standard is not proving a limiting factor in securing the numbers of pilots required.

Pensions and allowances may be paid to the widows and dependants of officers and men who die as prisoners of war at the same rates and under the same conditions as if they had been killed in action, if it is certified by the medical advisers of the Ministry of Pensions that death was due to or materially hastened by a wound, injury, or disease directly attributable to or materially aggravated by service in the war.

Men examined by a medical board and found to be unfit for any form of military service are placed in Grade IV and are not called up.

The War Office is considering a proposal to appoint a senior woman medical officer in each Army Command in connexion with the health services for women auxiliaries.

During operations in Norway bombs were aimed, unsuccessfully, Mr. R. A. Butler states, at a British hospital ship which was lying apart from all other ships. On three occasions Norwegian hospital ships have been bombed in Norwegian waters with loss of life to doctors and nurses.

Dr. Elliot understands from the Board of Control that agreement has been reached in principle between the War Office and the local authorities concerned on the charges to be made to the War Office to cover the use of mental hospital premises and services. It is hoped the details will be settled at an early date.

The National Institute of Chiropody has been informed that chiropodists sufficient for the needs of the Army are trained at military hospitals, and should further assistance be required the advice of the British Medical Association will be taken.

The Services

CHADWICK PRIZE AND GOLD MEDAL

The Chadwick Trustees are authorized to "present once in every five years the sum of £100 and a gold medal to be called the Chadwick Navy, Army, or Air Force Prize to such officer of the Navy, Army, or Air Force Medical Service as shall during the preceding five years have specially assisted in promoting the health of the men in the Navy, Army, or Air Force, and shall be nominated for such presentation in the case of an officer of the Navy by the Director-General of the Navy Medical Service of the Crown, in the case of an officer of the Army by the Director-General of the Army Medical Service, and in the case of an officer of the Air Force by the Director-General of the Air Force Medical Service." The trustees have approved of the nomination of Wing-Commander Philip Clermont Livingston to receive the prize and gold medal, which are to be presented on Thursday, June 20, at 3.45 p.m. (before the Chadwick Lecture at 4 p.m.) at the Chelsea Physic Garden, Swan Walk, S.W. The presentation is to be made by the chairman of the Chadwick Trustees, Sir William Collins, and Wing-Commander Livingston will be introduced by Air Marshal Sir Victor Richardson, Director-General of Medical Services, Royal Air Force.

CASUALTIES IN THE MEDICAL SERVICES

ROYAL NAVY

On May 10 was published a list of officers and men of H.M. Submarine *Sterlet*, reported by the Admiralty as missing, long overdue, and now given up as lost. Among the officers was Probationary Temporary Surgeon Lieutenant JOHN SMYTH CRONE, R.N.V.R. Dr. Crone took the M.R.C.S., L.R.C.P. in 1939 and joined the British Medical Association this year.

HONORARY SURGEON TO THE KING

Lieutenant-Colonel D. C. Monro, R.A.M.C., has been appointed Honorary Surgeon to the King, vice Major-General G. G. Tabuteau, D.S.O., late R.A.M.C., since deceased.

Medico-Legal

DROPPED FOOT AS AN ACCIDENT

Workmen's compensation law provides that a workman may have compensation for personal injury due to accident arising out of and in the course of his employment. The word "accident" has come to mean a good deal more than it usually means in everyday speech. Lord Lindley, in Stuart *v.* Wilson and Clyde Coal Company (1902), said that it means any unintended and unexpected occurrence which produces hurt or loss. In the same case Lord M'Laren said that if a workman sustains a physiological injury as a result of his work, that is accidental injury in the sense of the statute.

Restatement of the Principle

The principle was fully examined and restated the other day by the House of Lords.[1] The workman was a packer, and his work was to build pillars to support the roof of a coal working. The roof was low and he had to work in a crouching position with the outside of his right knee pressing on the pavement. During the month before his injury he suffered from a loss of power to dorsiflex his right foot. One day, after about twenty minutes in the crouching position, he felt his right foot numb. He finished his shift and walked home with the help of his father. The doctor diagnosed his condition as dropped foot—a paralysis of the muscles of the leg caused by pressure on the peroneal nerve. He claimed compensation for injury by accident, but the sheriff-substitute found that there had been no accident within the meaning of the Act.

The House of Lords reviewed a great many reported decisions in cases where the injury had been due to a process extending over a period or to infection, or had been contributed to by ill-health in the workman. The Lord Chancellor applied in the end the test which their lordships had formulated in 1902. This workman, he said, had sustained a definite physiological injury in the performance of his duties and as a result of the work he was doing at the time of his injury. Lord Atkin had no doubt that this was the correct view. The man had suffered a physiological change brought about by an undesigned and untoward event happening in the employment. Their lordships did not, on the facts, have to determine finally whether incapacity due to a disease of gradual onset and progressive development can be an accident within the meaning of the Act.

[1] Fife Coal Company, Limited, *v.* Young. 1940, 2 All E.R. 85.

Medical News

"Food Poisoning" and "Supervision of Food Supplies" will be discussed at a sessional meeting of the Royal Sanitary Institute at Plymouth Guildhall on Saturday, May 25, at 10 a.m. Dr. W. N. M. Mason will introduce the first subject, and the second discussion will be opened by Mr. C. E. Sanderson.

Professor W. W. C. Topley, F.R.S., will deliver a lecture on "Bacteria in the Air" before the Royal Institution, 21, Albemarle Street, W., on Friday, May 31, at 8 p.m.

The next quarterly meeting of the Royal Medico-Psychological Association will be held at 11, Chandos Street, W., on Wednesday, May 22, at 2.30 p.m., when Dr. J. Bierer will read a paper on "Psychotherapy in Mental Hospital Practice."

A meeting of the British Institute of Radiology will be held at 32, Welbeck Street, W., on Thursday, May 30, at 2.30 p.m., when Drs. J. Read, F. G. Spear, J. C. Mottram, and L. H. Gray will read papers on "Physical and Biological Experiments with Neutrons." The annual general meeting of the Institute will be held at 6.30 p.m.

A meeting of the Medico-Legal Society will be held at 26, Portland Place, W., on Thursday, May 23, at 8 p.m., when a paper will be read by Dr. Hugh A. Grierson on "The Medical Examination of Prisoners."

The B.B.C. announces that on Sunday, May 19, at 8.40 p.m. in the Home Service programme Dr. Clement C. Chesterman, honorary secretary, British Advisory Board on Medical Missions, is appealing on behalf of British medical missions over-seas. Over 1,033 British doctors and nurses are carrying on medical missionary service over-seas in British Colonies, India, the Pacific Islands, China, and certain lonely corners of the world. They heal disease, combat epidemics, care for the wounded, are responsible for maternity, infant welfare, and school health, train native doctors, nurses, technicians, and voluntary lay workers, and develop preventive medicine in co-operation with Government.

A United Hospitals Socialist Association for medical students in London was formed at a meeting of such students held on April 23. The meeting, which had been summoned for the purpose by the chairman of the Joint Medical Socialist Committee, Mr. Ruscoe Clarke, was attended by about sixty students, nearly half of whom were women. After Mr. Somerville Hastings had given an address, the motion to form such a body was moved by a student and received unanimous assent, and a committee was elected consisting of six members, one each from King's, Middlesex, Guy's, and St. Bartholomew's, and two from University College. The functions which such a body might undertake were discussed; briefly they are educational and social activities, the setting up of study groups, and a general exchange of ideas on medico-political subjects. Affiliation with the Socialist Medical Association was also mooted.

After May 24 the address of the Royal Medical Benevolent Fund will be 1, Balliol House, Manorfields, Putney, S.W.15. Telephone: Putney 6128.

The March issue of the *Bulletin de l'Office International d'Hygiène Publique* contains an article by Professors D. Danielopolu, N. G. Lupu, E. Craciun, and M. Petrescu, of Bucharest, on war typhus, its association with typhoid and relapsing fevers, and the necessity for inoculation against typhus at the present time.

The May issue of the *Post-graduate Journal* is devoted to war wounds of the limbs.

Circular 1506 issued by the Board of Education to local education authorities announces that the Board hopes to give material assistance to the movement for the better utilization of food and the improvement of domestic catering. The Ministry of Food is issuing leaflets on the principles of diet and methods for avoiding waste. The Board desires local education authorities to offer assistance on the distribution and popularization of these publications.

By the latter part of April 700,000 persons had been evacuated from the zone of operations in France and distributed among the rural districts of the south-west. About 400,000 children had been evacuated from the towns. The general conditions remain good and no epidemic has broken out.

Dr. Smith Ely Jelliffe, editor of the *Journal of Nervous and Mental Diseases*, has been made an honorary member of the Dutch Society of Psychiatry and Neurology.

Professor Fernando Enriquez de Salamanca y Danvila, president of the Royal Academy of Medicine of Madrid, has been nominated dean of the Madrid medical faculty.

The Italian Minister of National Education has recently created a chair of phthisiology at Naples, the second one of the kind after that at Rome founded in 1928.

The Rockefeller Foundation has transferred its European office from Paris to La Baule.

The herbarium of indigenous medicinal plants which is being collected at Calcutta under the aegis of the School of Tropical Medicine now contains 1,500 species, or approximately 5,000 specimens.

No. 17

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended April 27, 1940.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included), (b) London (administrative county), (c) Scotland, (d) Eire, (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1940					1939 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	385	33	72	4	3	37	4	5	2	1
Deaths		5	7				—	—		
Diphtheria	680	37	224	44	26	816	87	160	19	12
Deaths	21	—	7	3	1	21	4	3	2	—
Dysentery	42	—	44		1	62	7	19		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	6	1	—	—	—	4	—	—	1	—
Deaths		1	2				1	2		
Enteric (typhoid and paratyphoid) fever	37	5	8	3	—	26	3	12	10	—
Deaths	1	—	—	—	—	1	—	—	—	—
Erysipelas			62	5	4			54	6	5
Deaths		—	—				—	1		
Infective enteritis or diarrhoea under 2 years	26	6	10	6	8	41	7	8	—	1
Deaths										
Measles*	4,568	38	305		162		45	133		—
Deaths	8	—	1	3	1	5	1	—	5	—
Ophthalmia neonatorum	90	9	17		—	90	9	41		1
Deaths										
Pneumonia, influenzal†	925	69	5	12	5	959	72	12	6	9
Deaths (from influenza)	41	7	4	1	3	53	6	2	2	—
Pneumonia, primary			248	17				169	12	
Deaths‡		41		15	19		10		21	5
Polio-encephalitis, acute	2	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	4	—	—		—	7	—	2		—
Deaths		—	—				—	—		
Puerperal fever	2	2	24	1	—	1	1	11	—	—
Deaths		—					3§			
Puerperal pyrexia	170	13	30		2	208	19	38		1
Deaths										
Relapsing fever	1	—			—	—	—			—
Deaths										
Scarlet fever	931	38	130	57	52	1,616	155	240	53	75
Deaths	1	—	—	—	—	4	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough*	646	15	42		7		471	400		39
Deaths	7	—	1	4	1	29	5	6	1	—
Deaths (0-1 year)	416	51	77	46	45	348	42	63	25	13
Infant mortality rate (per 1,000 live births)						54	36			
Deaths (excluding still-births)	5,226	849	725	237	187	4,632	852	568	185	134
Annual death rate (per 1,000 persons living)			13.1	15.8	16.4	11.4	10.9	11.5	12.4	11.8
Live births	6,530	997	950	373	279	6,572	1,200	1,025	369	285
Annual rate per 1,000 persons living			19.2	24.9	24.5	16.1	15.4	20.8	24.8	25.0
Stillbirths	266	31	41			275	56	43		
Rate per 1,000 total births (including stillborn)			41			40	45	40		

* Made notifiable generally on November 1, 1939.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Since January 1, 1940, figures for London (b) have been for deaths from all forms of pneumonia; the corresponding figures for 1939 relate to deaths from lobar pneumonia only.

§ Death from puerperal sepsis.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

In England and Wales notifications of the principal notifiable diseases have increased during the week, with the exceptions of diphtheria and cerebrospinal fever. For the third week in succession there were no cases of diphtheria in South Shields, where the disease has been prevalent for over two years.

The increase in the incidence of the enteric fevers is due largely to the occurrence of a series of sporadic cases in the county of Lancaster, which accounted for over a third of the total for the whole country. In this county there were 14 cases (Liverpool 2, Oldham 2, Bootle 1, Crosby M.B. 2, Chadderton U.D. 6, and Preston R.D. 1), compared with 7 in the previous week (Oldham 2, Wigan 1, Atherton U.D. 1, Crosby M.B. 1, Fleetwood M.B. 1, and Chorley R.D. 1). Reports have been received that the disease is paratyphoid, and that the public health authorities have identified a "carrier" who was employed in the handling of food by a large firm of distributors. Altogether enteric fever was notified in fourteen counties, but only in two others were there more than two cases—namely: London 5 (Westminster 2, Kensington, Lewisham, Wandsworth 1 each); Surrey 4 (Croydon 2, Wimbledon M.B. 1, Malden and Coombe U.D. 1).

Over one-third of the cases of measles were in Lancaster, where the disease is now spreading to the large towns. Details are given of the distribution of some of the cases in the ten counties in which more than 100 cases were notified during the week: Lancaster 1,431 (Barrow-in-Furness 235, Blackburn 59, Blackpool 70, Liverpool 41, Manchester 50, Oldham 189, Preston 90, St. Helens 72, Wigan 60, Accrington M.B. 49, Chadderton U.D. 60, Middleton M.B. 73); Yorks West Riding 584 (Huddersfield 153, Keighley 67, Leeds 26, Harrogate 29, Worsborough U.D. 24, Holmfirth U.D. 23, Elland U.D. 22); Durham 323 (Darlington 128, Crook and Willington U.D. 62, Bishop Auckland U.D. 36); Glamorgan 278 (Swansea 85, Port Talbot M.B. 40, Pontardawe R.D. 49, Llwchwr U.D. 33); Chester 205 (Chester 54, Northwich R.D. 39 and U.D. 21); Leicester 117 (Leicester 76, Barrow-upon-Soar R.D. 32); Sussex East 117 (Brighton 83); Gloucester 107 (Bristol 43); Monmouth 105 (Newport 32, Tredegar U.D. 28). Of the 305 cases notified in Scotland 46 were in Lanark county, 199 in Glasgow, 15 in Rutherglen (both in Lanarkshire), and 23 in Edinburgh. Measles is notifiable in only a few districts in Northern Ireland; of the 162 cases notified during the week 154 were in Belfast and 8 in Lisburn urban district. One death from measles was recorded in each of the following towns: Belfast, Barrow-in-Furness, Glasgow, Keighley, Leeds, Oldham, St. Helens, Wigan, Gloucester, Plymouth.

The fall in the incidence of cerebrospinal fever has slowed down, notifications for the whole country being only 5 fewer than in the previous week. Of the forty-eight administrative areas affected there were more than 10 cases in only twelve. Lancaster, London, and Glamorgan remain the principal centres of the disease, as they have been throughout the epidemic period. Naturally the big towns have been responsible for the bulk of the cases, but in proportion to the population rural districts have perhaps been quite as heavily hit. No exact comparison is at present possible on account of the recent changes in these populations due to the inflow of evacuees and non-civilians.

The Department of Scientific and Industrial Research has issued a report describing the work carried out on behalf of its Food Investigation Board on the importance of various factors responsible for the production of the flavour in bacon and ham (Food Investigation Special Report 49—"The Function of Nitrate, Nitrite, and Bacteria in the Curing of Bacon and Hams"—H.M. Stationery Office, 9d.). This indicates the possibility of recasting the present practice so as to give the curer better control over the quality of his product, so far as this is determined by the curing.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS.—All communications should be addressed to the Advertisement Manager (office hours, 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House.

The TELEPHONE NUMBER of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The TELEGRAPHIC ADDRESSES are

EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*

SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Eireann (I.M.A. and B.M.A.), 95, Merrion Square, W., Dublin (telephone 62550 Dublin).

QUERIES AND ANSWERS

One-sided Glossitis

"ARDUA" writes: Would some of your readers kindly suggest treatment for a glossitis involving the right side of the tongue. The margin is red and rough. There is no oral sepsis, as the teeth have been extracted on that side and dentures are not worn. I have tried various astringents (tinct. hamamelis, etc.), which do not relieve the condition. I smoke twenty cigarettes a day.

Cramp in Legs

"G. K. P." writes: I am over 70, and have occasionally cramp in the legs waking me up at night. Recently I had a very painful attack in the right calf muscles. The next day and since then rheumatism has shown itself in these muscles, and I am treating it with sodium salicylate and potassium citrate with benefit. There is something in the blood that irritates acutely the muscle and causes the painful contraction. In my case it is rheumatism.

Books for Ship Surgeon

"S. C. P." (Worcester) writes in reply to "J. A. K.'s" inquiry of May 4 (p. 756): I would recommend the following books as being particularly serviceable to the ship surgeon: (1) *Emergency Operations for General Practitioners on Land and Sea*, by H. C. Orrin; (2) *Ship-Surgeon's Handbook*, by A. V. Elder; (3) Martindale's *Extra Pharmacopoeia*. If no textbook on tropical diseases is supplied by the company for the use of the ship surgeon I would suggest either (4) *Manson's Tropical Diseases* (edited by P. H. Manson-Bahr) or (5) *Memoranda on Medical Diseases in Tropical and Sub-Tropical Areas*. But it must be borne in mind that the ship surgeon is a *general* practitioner in the widest sense, as he may be called upon to perform emergency operations or act in the capacity of a consultant. I would therefore strongly advise him to take his own textbooks on eyes, skin, and midwifery. Finally, every ship surgeon embarking on a long voyage should read *The Surgeon's Log*, by J. J. Abraham, as a stimulant before sailing.

Diet in Jejunal Ulcer

Dr. JOSIAH OLDFIELD writes in reply to Dr. R. M. Russell (April 27, p. 718): I should like to point out that it is one of the old and exploded theories that in cases of possible ulceration of the alimentary canal the only diet allowed is what is or was called a "bland dietary," which contained nothing thicker than custard. I recall in my student days at Bart's how the sisters impressed upon the probationers that all typhoid cases must be milk-fed, and not a grain of solid food should be given, lest perforation of an alimentary canal ulcer should follow. This was probably

the reason why Dr. Russell's patient was told to live on tripe for three months. One can quite understand why he has an empty feeling, is extremely constipated, and longs for something to eat. After long personal experience I have come to the conclusion that one of the best diets for a case of this sort is well-cooked frumenty, honey, and either fresh milk or curds, or soured milk. When frumenty is well made it gives bulk for the intestinal muscles to grip, and therefore cures constipation. It produces sufficient mass, and at the same time it has no irritating edges, but forms a soft pultaceous dish. This diet gives a sense of comfortable fullness, prevents constipation, and produces all the elements necessary for complete nutrition to a patient suffering from weakened digestive function.

Income Tax

Expenses—Residence in Eire

"G.P.'s" inquiries can be deduced from the following replies.

*** The depreciation allowance on a car is calculated by taking the original cost at 20 per cent. for the first year—that is, £200 at 20 per cent. = £40; for the second year it is 20 per cent. on the reduced value—that is (£200 − £40 =), £160 at 20 per cent. = £32; the third year it will be £160 − £32 = £128 at 20 per cent.—that is, £26, and so on. The cost of licences, insurances, repairs, etc., is allowable. If neither the inspector nor "G.P." has retained records of the receipts and expenses for 1934 it is probably impossible to reopen the assessment for that year. If, in the circumstances, "G.P." becomes a resident in Eire he will not, as from then, be liable to United Kingdom tax. Probably a local office in Dublin can advise him further on that point.

Assistance to Brother

"G." has a brother who is a student, and has accepted responsibility for payment of his fees and maintenance. Is he entitled to an allowance for such expenses?

*** No—the dependant relative allowance applies only where the relative is "incapacitated by old age or infirmity from maintaining himself."

LETTERS, NOTES, ETC.

A Nursing Recruitment Centre

Some time ago the King Edward's Hospital Fund was asked by the Voluntary Hospitals Committee for London whether it could not assist the hospitals in their difficulties in obtaining sufficient recruits for the nursing staff. At the same time the Voluntary Hospitals Committee placed evidence before the Interdepartmental Committee on Nursing Services stressing this point. The Interdepartmental Committee agreed in its report that it would be very valuable if some authoritative centre were set up where girls wishing to enter the nursing profession could obtain advice as to how best to do so and from which lecturers and speakers could be obtained by schools and similar bodies in order to encourage candidates to apply. The King's Fund voted the money necessary for the establishment of this centre last year, and arrangements were made for the centre to be opened in September. This was, of course, postponed, but now the King's Fund is going forward with the project and the Nursing Recruitment Centre has been opened at 21, Cavendish Square, London, W.1, where it is available to all who wish to enter the nursing profession. It is staffed by State-registered nurses, who are prepared to give information on all branches of nurse training, and individual guidance as to entering upon a nursing career. The centre will keep in close touch with the training schools, and will collect and distribute information as to the various pre-nursing courses now being established as a means of "bridging the gap" between the age of leaving school and that of entering hospital.

Training of the Blind

The National Institution for the Blind has issued a pamphlet dealing with the higher education of blind persons. It is an encouraging document, because it gives a list of well-known persons who hold high positions notwithstanding the handicap of blindness; these include men in holy orders, in university and other teaching, in law, and in business and administration. But, of course, there are many other rather humbler walks of life open to blind persons. It is not enough for local authorities to make grants for training; an endeavour must be made to find employment for the qualified persons, against whom there is sometimes a prejudice on account of their blindness. Information is given about the special training establishments run by the National Institute and other organizations, especially the Institute's School of Massage and Electrotherapy in Great Portland Street, London. Here a two-years training is given in the anatomy, physiology, and pathology necessary for the work of such auxiliaries, in the theory and practice of massage, in Swedish remedial exercises, and in electrotherapy, and the examinations taken are those of the Chartered Society. It is mentioned that blind chartered masseurs and masseuses who have passed through the school hold appointments under the Ministry of Pensions, the British Red Cross Society, and many hospitals and local authorities.

Rubella in a Young Infant

Dr. H. C. CRAVEN VEITCH (St. Neots) writes: Dr. A. Freitag's note (May 11, p. 798) interested me, as I have just treated an infant under 5 weeks old with typical rubella. Perhaps it is not so uncommon in infants as one is led to believe.

A Plea for Cheaper Medical Books

"F. L." writes from India: The rapidly growing number of books on medical subjects and the frequency with which new editions occur are increasing the difficulties of the purchaser. The amount of new work being published is so great that the practising doctor could not hope to keep up with it, still less estimate its value. This makes it imperative that he should have at his disposal those books—for example, on pulmonary tuberculosis, infective diseases, diseases of the nervous system, etc.—written by the specialist where an adequate idea can be obtained of the present position in the particular branch of medicine. This need cannot be served by the libraries, since on the one hand at least one reasonably compendious book should be on the shelves of each practitioner, and in my experience in practice in England the book required always arrived at a period when one could not take the best advantage of it. To buy the books at the moment and replace them as something more up-to-date is published is financially impossible. The only answer to this problem seems to be cheaper books. When one considers how ephemeral is the value of most medical books to-day it seems ridiculous to publish so many of them as if they were presentation volumes of some poet or famous author. Published after the French style with paper backs, any book which one felt worth it could be bound in some more enduring manner. This would bring them within a moment's thought instead of the present serious consideration as to whether they justify the expenditure of forty or fifty shillings. At the moment it is impossible to get more than an elementary treatise under thirty shillings. One realizes that there must be a return to the publisher and the author for the effort of production, and that the limited number of those desirous of purchasing the book tends to increase the price. I merely contend that some of the cost could be saved by a much simpler style of publication, and also that the reduced price of the book would increase the sales enormously.

Books for the Forces

The topic of boredom on the home front has recently been discussed in our correspondence columns, and it has also been recognized as a malady that may afflict men in the Forces stationed in parts where but little fighting is done. The Lord Mayor of London and the Lord Provost of Edinburgh have recently appealed on behalf of the Service Libraries and Books Fund—an appeal which should find a response among members of the medical profession. Those who have books to spare, whether technical or otherwise, are asked to send them to the Secretary, City of London Territorial Army and Air Force Association, Finsbury Barracks, City Road, E.C.1. We are informed that as well as books the fund also needs money with which to buy classes of literature not given by the public—for example, works on the Near East or Scandinavian dictionaries. Contributions, therefore, will be as welcome as books, and cheques should be sent to the Lord Mayor of London, The Mansion House, London, E.C.4. Envelopes should be clearly marked "Books."

Corrigendum

We hasten to correct a small error in the account of Mr. Lionel Colledge's contribution to the discussion on radiotherapy in cancer of the upper respiratory and alimentary tracts, published last week at p. 784. The 153 cases of laryngeal cancer submitted to operation were operated on between 1920 and 1935 (not 1930 and 1935). Of these seventy-six have remained well for more than five years; and there are thirty-four which have remained without recurrence for more than ten years—twenty-seven in the intrinsic group and seven in the extrinsic group.